Fachhochschule des Mittelstands

Future Classroom

Workshop University of Montenegro

5.6.26

Session 3:

09.00-11.00: AI in Education and technology-powered Economy - Opportunities and Challenges facing AI

Prof. Dr. Rulf J. Treidel

European Commission

SPHERE Support and Promotion for Higher Education Reform Experts

UCG Univerzitet Crne Gore

UDG

3. Changed Learning Models and Future Education Paradigm Shift in Teaching

Aspect	Traditional	Modern
Role of the Teacher	Knowledge Provider	Learning Facilitator
Learning Method	Lecture-Based Teaching	Active Learning (PBL, Flipped Classroom)
Assessment	Standardized Tests	Competency-Based Assessment

2. Innovative Classroom Design: Trends

Trend 1 – Flexibility & Hybrid Learning

Trend 2 – Globalization & International Collaboration

Trend 3: Shift from knowledge acquisition to competencies: problem-solving, creativity, teamwork

Trend 4: Culture and Mindset: Openness to change and Innovation -Emphasis on lifelong learning and adaptability

Trend 5 Digitalization & AI

AI in Education and technology-powered Economy - Opportunities and Challenges facing AI

1. Advantages and Disadvantages of AI in Higher Education
2. AI Recommandation by FHM for Students and Teachers,
3. Equipping Learners for a Technology Powered Ecomony
4. Conclusion

2. Advantages and Disadvantages of AI in Higher Education

1. **Introduction to AI in Academic Writing and Research**
2. **Advantages of AI in Academic Writing and Research**
    - Personalized Learning and Accessibility
    - Administrative Automation and Efficiency
    - Enhanced Research and Data Analysis
    - AI in Drafting, Editing, and Peer Review
3. **Disadvantages and Challenges of AI in Academic Writing and Research**
    - Bias and Fairness
    - Data Privacy and Security
    - Digital Divide and Inequitable Access
    - Ethical and Academic Integrity Risks
4. **Case Studies and Real-World Examples**
5. **Ethical Considerations and Policy Recommendations**
6. **Future Trends and Conclusion**

2. Advantages and Disadvantages of AI in Higher Education

2.1 Definition: AI in academic writing and research refers to the use of machine learning, natural language processing (NLP), and other AI technologies to enhance the creation, analysis, and dissemination of scholarly work.

Key Areas:

Literature Reviews: AI tools like Elicit and Consensus synthesize large volumes of research, reducing review time by up to 40%.

Data Analysis: AI processes complex datasets, identifies trends, and generates visualizations (e.g., IBM Watson, Google Scholar AI plugins).

Drafting and Editing: Tools like Grammarly, Wordtune, and Jenni AI improve clarity, coherence, and language accuracy.

Administrative Tasks: Automation of grading, attendance tracking, and scheduling (e.g., Gradescope, Zapier).

Growth:
AI adoption in academia has surged, with tools like ChatGPT, Elicit, and Gradescope becoming integral to research and writing processes. A 2026 survey by *Nature* found that **68% of researchers** use AI tools for literature reviews, while **51% of students** use AI for drafting papers.

2. Advantages and Disadvantages of AI in Higher Education

2.1 AI Literacy

- **Why It Matters**: AI literacy ensures that researchers, educators, and students understand the **capabilities, limitations, and ethical implications** of AI tools. Without this knowledge, users risk misapplying AI, perpetuating biases, or violating academic integrity.

- **Key Skills for AI Literacy**:
  1. **Understanding AI's Role**:
     - How AI assists in data analysis, literature reviews, and drafting.
     - Limitations: AI cannot replace human judgment, creativity, or ethical reasoning.
  2. **Recognizing Bias**:
     - AI systems can inherit biases from training data (e.g., racial or gender bias in grading tools).
     - **Example**: The COMPAS algorithm (2016) predicted recidivism with racial bias, highlighting the need for diverse training datasets.
  3. **Compliance with Ethical Guidelines**:
     - Adherence to academic integrity standards (e.g., COPE guidelines).
     - Transparency in disclosing AI use in manuscripts.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Personalized Learning and Accessibility

How AI Helps: AI adapts content and pacing to **individual learning needs**, improving engagement and outcomes.

Example Tools: ALEKS (Assessment and Learning in Knowledge Spaces), Khan Academy, DreamBox.

Impact: Studies show a **30% improvement in test scores** for students using adaptive learning platforms (RAND Corporation, 2023).

Mechanism: AI identifies knowledge gaps in real-time and adjusts lessons accordingly.

Case Study:
Arizona State University implemented ALEKS for math instruction, resulting in **higher pass rates** and reduced dropout rates in STEM courses.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Accessibility

AI for Diverse Needs:

Speech-to-Text Tools: Dragon NaturallySpeaking, Otter.ai (for students with dyslexia or mobility impairments).

Translation Tools: Google Translate, DeepL (for non-native English speakers).

Visual Assistance: AI-powered screen readers (e.g., JAWS) for visually impaired students.

Statistic:
1 in 5 students globally have learning differences (UNESCO, 2025).

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Administrative Automation and Efficiency

Automated Grading:

Tools: Gradescope, Turnitin, Crowdmark.

Impact:

Reduces grading workloads by **up to 40%** (EdTech Magazine, 2026).

Improves **consistency and objectivity** in assessment.

Example: Gradescope's AI-assisted grading for STEM courses at MIT reduced grading time by **35%**.

Challenges:

Faculty resistance to automation due to concerns about **loss of human judgment**.

Risk of **over-reliance** on AI, reducing critical feedback for students.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Literature Reviews

- **Tools**: Elicit, Consensus, Scite.ai, ResearchRabbit.
- **How AI Helps**:
  - **Synthesizes large volumes of research** in minutes.
  - Identifies **gaps, trends, and key citations** in existing literature.
  - **Impact**: Reduces literature review time by **up to 40%** (Elicit, 2025).
- **Example**:

A 2024 study in *Nature* used Elicit to analyze **10,000+ papers** on climate change, identifying critical research gaps in **half the time** of traditional methods.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Data Analysis

- **Tools**: IBM Watson, Google Scholar AI plugins, Tableau (AI-powered analytics).
- **How AI Helps**:
  - Processes **complex datasets** (e.g., genomic data, climate models).
  - Generates **visualizations and predictive models**.
  - **Example**: IBM Watson analyzed **millions of medical records** to identify patterns in disease progression, aiding cancer research.
- **Impact**:
  - Accelerates **research processes** and improves **rigor and clarity** in scientific communication.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Drafting and Editing:

- **Tools**: Grammarly, Wordtune, Jenni AI, ProWritingAid.
- **How AI Helps**:
  - Improves **clarity, coherence, and language accuracy**.
  - **Example**: Grammarly's AI detects **grammar errors, plagiarism, and tone inconsistencies**, enhancing the quality of academic writing.
  - **Impact**: Particularly beneficial for **non-native English speakers** (e.g., researchers in non-English-speaking countries).
- **Statistic**: A 2025 survey by *The Scientist* found that **72% of non-native English-speaking researchers** use AI tools to improve their writing.

2. Advantages and Disadvantages of AI in Higher Education

2.2 Advantages: Peer Review

- **Tools**: Turnitin, iThenticate, AI-powered review assistants (e.g., Scholarcy).
- **How AI Helps**:
  - **Detects plagiarism** and ensures originality.
  - Identifies **reviewer bias** and speeds up the review process by **30%** (Turnitin, 2026).
  - **Example**: *Journal of Medical Ethics* used AI to analyze **1,000+ peer reviews**, identifying patterns of bias in reviewer feedback.
- **Impact**:
  - Reduces **plagiarism** and improves **fairness in academic publishing**.

2. Advantages and Disadvantages of AI in Higher Education

2.3 Disadvantages and Challenges: Bias and Fairness

Definition: AI systems can **perpetuate and amplify biases** present in their training data, leading to **discriminatory outcomes** in research, grading, and publishing.

Examples of Bias in AI:

1. **COMPAS Algorithm (2016)**:
   - Predicted recidivism with **racial bias**, disproportionately flagging Black defendants as high-risk.
   - **Source**: ProPublica Investigation
2. **Scopus AI**:
   - Favors **Elsevier journals**, skewing literature representation and marginalizing non-English or open-access publications.
   - **Source**: PMC: Bias in Scopus AI
3. **Grading Tools**:
   - AI grading tools may favor **standardized language**, disadvantaging non-native speakers or students from diverse linguistic backgrounds.
   - **Source**: MIT Study on AI Bias (2024)

2. Advantages and Disadvantages of AI in Higher Education

2.3 Disadvantages and Challenges: Bias and Fairness

Impact:
- Reinforces **inequalities** in academia.
- Undermines **fairness and credibility** in research and publishing.

Solutions:
- Use **diverse and representative training datasets**.
- Implement **human oversight** and regular audits of AI tools.
- Develop **bias mitigation algorithms** (e.g., fairness-aware machine learning).

2. Advantages and Disadvantages of AI in Higher Education

2.3 Disadvantages and Challenges: Data Privacy and Security Risks

1. **Data Breaches**:
    1. Student and research data uploaded to AI platforms may be **exposed or misused**.
    2. **Example**: Italy's **temporary ban on ChatGPT in 2023** due to privacy concerns over user data collection.
2. **Lack of Transparency**:
    1. Many AI tools do not disclose **how data is collected, stored, or used**.
    2. **Example**: OpenAI's ChatGPT was criticized for **training on user inputs without explicit consent**.
3. **Third-Party Sharing**:
    1. Some EdTech companies **sell student data** to third parties for advertising or research.
    2. **Example**: A 2025 report by *The New York Times* revealed that **several AI tutoring tools** shared student data with advertisers.

2. Advantages and Disadvantages of AI in Higher Education

2.3 Disadvantages and Challenges: Data Privacy and Security Risks

Regulations:

- **GDPR (EU)**: General Data Protection Regulation.
- **FERPA (US)**: Family Educational Rights and Privacy Act.
- **Montenegro's Data Protection Law (2024)**: Aligns with EU GDPR standards.

- **Best Practices:**
- **Anonymize Data**: Remove personally identifiable information (PII) before uploading to AI tools.
- **Transparent Policies**: Clearly communicate **how data is used and protected**.
- **Compliance**: Ensure adherence to **local and international data protection laws**.

2. Advantages and Disadvantages of AI in Higher Education

2.3 Disadvantages and Challenges: Digital Divide and Inequitable Access

Global Disparities:

- **90% of AI EdTech tools** are used in **high-income countries** (UNICEF, 2026).
- **Example**: In **Montenegro**, only **45% of rural schools** have reliable internet access (World Bank, 2025).
- **Impact**:
  - Students in **underserved areas** lack access to AI-enhanced education, exacerbating **existing inequalities**.
  - **Low-income students** may fall further behind due to limited access to technology.

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: Kenya's Loan Algorithms

AI-driven loan algorithms in Kenya's fintech sector **reinforced gender bias**, disproportionately denying loans to women.

https://theconversation.com/overcoming-the-algorithmic-gender-bias-in-ai-driven-personal-finance-281250

Possible Solutions:

1. **Offline AI Tools**: Develop AI tools that work **without internet access** (e.g., Kolibri, an offline digital library https://learningequality.org/kolibri/about-kolibri/).
2. **Government Subsidies**: Provide **funding for tech access** in rural and low-income schools.
3. **Partnerships**: Collaborate with **NGOs and private sector** to bridge the digital divide.

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: Ethical and Academic Integrity Risks

Plagiarism and Misinformation:

- **AI-Generated Content**:
  - AI tools can produce **plagiarized or misleading content**, risking academic misconduct.
  - **Statistic**: **43% of students** admit using AI tools for academic work, with **18% submitting AI-generated content without disclosure** (ScienceDirect, 2025).
- **Hallucinations**:
  - AI may generate **false or fabricated information** (e.g., fake citations, incorrect data).
  - **Example**: A 2024 study in *Nature* found that **ChatGPT invented citations** in 5% of its responses.

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: Accountability

Who is Responsible?

- AI lacks **transparency** in how it generates outputs, raising questions about **accountability for errors or biase**
- **Human Oversight**: Always verify AI-generated content for accuracy and bias.
  - AI lacks **transparency** in how it generates outputs, raising questions about **accountability for errors or biases**.
  - **Example**: If an AI tool produces a **biased or incorrect result**, who is responsible—the user, the developer, or the institution?
- **Solutions**:
  - **Disclosure**: Mandate disclosure of AI use in manuscripts.
  - **Human Oversight**: Always verify AI-generated content for accuracy and bi

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: Ethical Dilemmas

1. **Authorship**: Should AI be listed as a **co-author**? Most journals (e.g., *Nature*, *Science*) **prohibit AI authorship**. https://publicationethics.org/

2. **Bias in Research**: AI tools may **perpetuate existing biases** in research (e.g., favoring certain demographics or regions).

3. **Data Manipulation**: AI can be used to **manipulate data or results**, undermining research integrity.

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: AI in Literature Reviews

Elicit https://elicit.com/

- **What It Does**:
  - Uses AI to **automate literature reviews**, reducing time by **40%**.
  - Identifies **key papers, gaps, and trends** in research.
- **Impact**:
  - **Case Study**: A 2024 study in *Nature* used Elicit to analyze **10,000+ papers** on climate change, identifying critical research gaps in **half the time** of traditional methods.
- **Limitations**:
  - May miss **nuanced arguments** in humanities or social sciences.
  - Risk of **over-reliance** on AI-generated summaries.

2. Advantages and Disadvantages of AI in Higher Education

2.4 Case Studies: AI in Peer Review

Turnitin: https://www.turnitin.com/

- **What It Does**:
  - Detects **plagiarism** and ensures **originality** in academic work.
  - Uses AI to compare submissions against a **database of 150+ billion pages**.
- **Impact**:
  - Reduces **plagiarism rates** by **30%** in universities (Turnitin, 2026).
  - **Example**: *Journal of Medical Ethics* used Turnitin to flag **12% of submissions** for potential plagiarism.
- **Challenges**:
  - **False Positives**: May flag **legitimate citations** as plagiarism.
  - **Over-Reliance**: Institutions may depend too heavily on AI, reducing **critical evaluation** by human reviewers.
  - Institutions may depend too heavily on AI, reducing **critical evaluation** by human reviewers.

2. Advantages and Disadvantages of AI in Higher Education

2.5. Ethical Considerations and Policy Recommendations: Ethical Frameworks for AI in Academia

Key Principles:

1. **Transparency**:
    1. **Disclose AI Use**: Always reveal when AI tools are used in research or writing.
    2. **Example**: Journals like *Nature* and *Science* require authors to **disclose AI assistance** in manuscripts.
2. **Fairness**:
    1. Ensure AI tools do not **perpetuate bias or discrimination**.
    2. **Example**: Audit AI grading tools for **racial or gender bias**.
3. **Accountability**:
    1. **Human Oversight**: Users must take responsibility for AI-generated content.
    2. **Example**: COPE (Committee on Publication Ethics) advises **against listing AI as an author**.

2. Advantages and Disadvantages of AI in Higher Education

2.5. Ethical Considerations and Policy Recommendations: Ethical Frameworks for AI in Academia

- **Guidelines:**
- **COPE Guidelines**:
  - AI cannot be listed as an **author** but must be **acknowledged** in the manuscript. https://publicationethics.org/

- **Institutional Policies**:
  - Develop **clear policies** for AI use in research, teaching, and administration.
  - **Example**: Stanford University's **AI Ethics Policy** mandates disclosure of AI use in academic work.

2. Advantages and Disadvantages of AI in Higher Education

Summary of Advantages:

- **Personalized Learning**: AI adapts to individual needs, improving engagement and outcomes.
  Accessibility: Breaks down barriers for students with disabilities and non-native speakers.
  Research Efficiency: Accelerates literature reviews, data analysis, and drafting.
  Administrative Automation: Reduces workload for educators, freeing time for teaching and research.

Summary of Challenges:

- **Bias and Fairness**: AI can perpetuate and amplify biases, requiring diverse training data and human oversight.
  Data Privacy: Risks of breaches and misuse demand strict governance and compliance.
  Digital Divide: Unequal access to AI tools exacerbates inequalities; solutions include offline tools and government subsidies.
  Ethical Risks: Plagiarism, misinformation, and accountability issues require clear policies and AI literacy.

2. Advantages and Disadvantages of AI in Higher Education

Call to Action:

For Educators:

Integrate AI tools into teaching and research **while promoting ethical use and critical thinking**.

For Students:

Use AI as a tool to **enhance learning and research**, but always **verify and take responsibility** for AI-generated content.

For Policymakers:

Develop and enforce policies that ensure **equitable access, data privacy, and ethical AI use** in academia.

Final Thought:

"AI in academic writing and research is a powerful tool, but its responsible use is paramount to maintaining the integrity and equity of scholarly work

2. Advantages and Disadvantages of AI in Higher Education

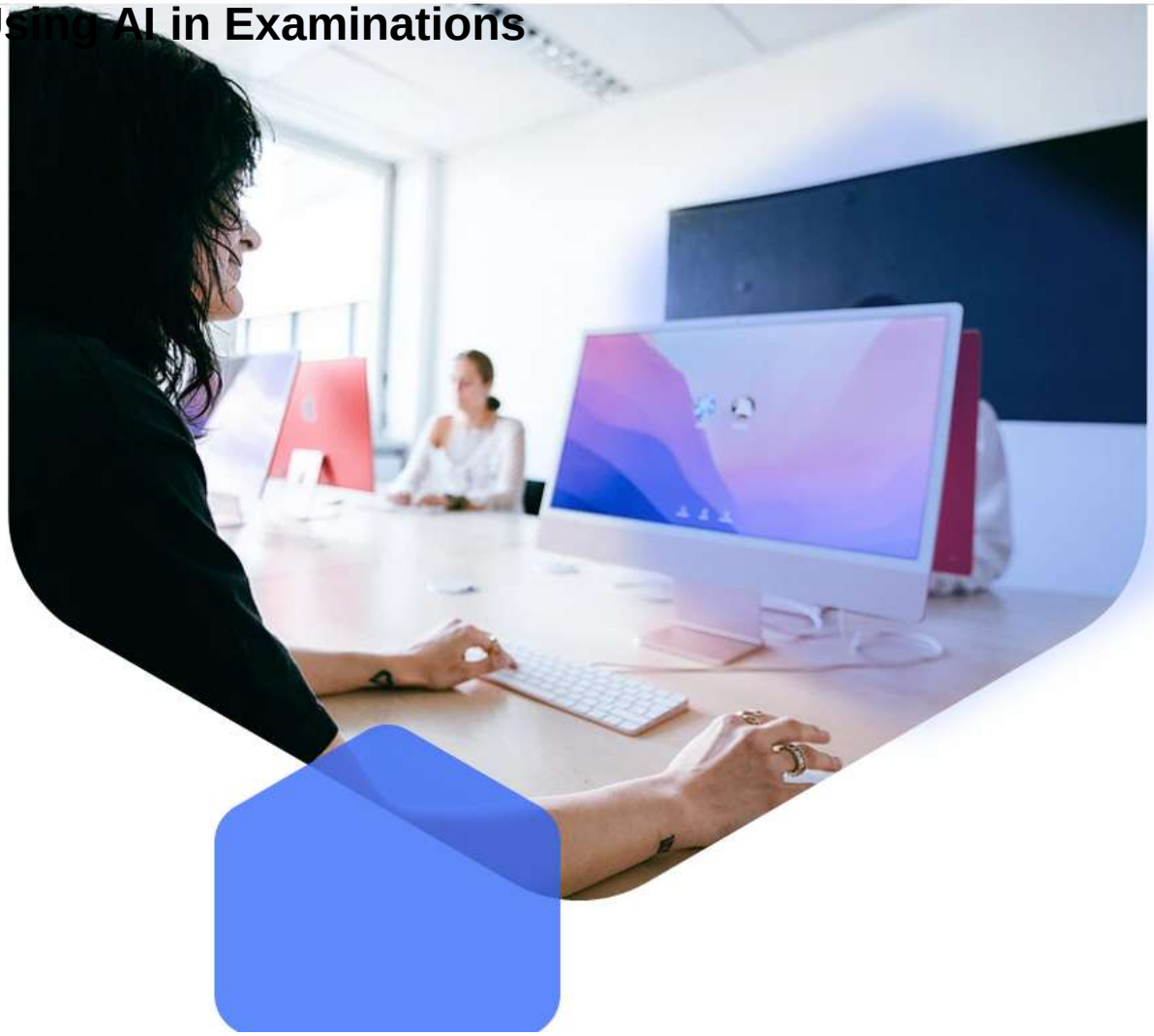
Discussion Questions

1. **Ethical Use of AI**:
   How can institutions ensure that AI tools in academic writing and research are used **ethically and responsibly**?
2. **Bias and Fairness**:
   What policies should be implemented to **address bias and fairness** in AI-generated academic content?
3. **AI Literacy Programs**:
   How can AI literacy programs be designed to **prepare students and researchers** for the challenges and opportunities of AI in academia?
4. **Role of Policymakers**:
   What role should **governments and policymakers** play in regulating AI use in higher education?
5. **Future of AI in Academia**:
   How will AI continue to **reshape academic writing and research** in the next decade?

Using AI in Examinations

FHM CAMPUS

Dein Campus | FHM und KI | Deine Benefits | Career Service Center | eLibrary | TraiNex | Technischer Support



Umgang mit KI in Prüfungen

Die FHM steht dem digitalen Wandel offen gegenüber und sieht den Einsatz von KI im Rahmen guter wissenschaftlicher Praxis als notwendig an, um für den künftigen Arbeitsmarkt zu qualifizieren. Studierende sollen Erfahrungen mit der Leistungsfähigkeit generativer künstlicher Intelligenz sammeln und beurteilen können, wie die Qualität der ausgegebenen Ergebnisse einzuschätzen ist.

FHM embraces digital transformation and considers the use of AI within the framework of good academic practice essential for qualifying students for the future job market. Students should gain experience with the capabilities of generative artificial intelligence and learn to assess the quality of the results it produces.

https://www.fhm-campus.de/ki-fhm/richtlinien-zur-nutzung-von-ki/

3. AI Recommandation by FHM for Students and Teachers

What You Need to Know When Using AI?

- Texts generated by AI tools do not meet the quality standards of academic sources.
- Most language models do not disclose their training data, making it impossible to trace how generated responses were produced. In the scientific process, it is essential to know how insights were obtained and which sources they are based on. Therefore, AI outputs (currently) cannot be cited as academic sources.
- AI results can be incorrect. Large language models (LLMs) combine words based on probabilities; they do not reproduce truths. This often leads to so-called hallucinations (fabricated or incorrectly assembled information), which compromise the reliability of the scientific knowledge process.
- Another cause of potentially incorrect AI results lies in biased or distorted training data: AI can generate discriminatory, stereotypical, or prejudiced statements.
- Anyone working with AI must recognize these risks. The author is responsible for the results of their academic work. This means they must guarantee the accuracy of the content. The statements, arguments, and selection of sources were deliberately chosen, and they must be able to explain all results.

3. AI Recommandation by FHM for Students and Teachers

Documentation of AI Use
All unsupervised written examinations (term papers, SiP, bachelor's and master's theses, presentations, and written practical professional exercises) must include a directory of the AI tools used. This AI directory should be placed after the bibliography."

Reflection on AI Use
FHM recommends reflecting on the use of AI in creating academic work. When AI tools are used, it is important to be able to assess their strengths and weaknesses.

The following questions can guide this reflection:

Goal/Role
- Why did you use AI? What problem was the AI supposed to solve?
- Which tasks did you consciously *not* delegate to the AI—and why?
- How would your work have looked without AI (e.g., in terms of content, method, effort, or quality)?

3. AI Recommandation by FHM for Students and Teachers

Quality

•How did you verify the facts (primary sources, peer-reviewed literature, data sources, cross-checking with multiple sources)?

•Where was there a risk of hallucinations, fabricated sources, incorrect citations, or false data? How did you verify all the information?

•How did you ensure a diversity of sources and perspectives (including those beyond what the AI recommends)?

•Did you use AI to find alternative approaches or perspectives—and how did you handle them?

•To what extent has AI changed your writing voice (e.g., style, complexity, confidence in taking clear positions)?

Bias and Stereotypes

•What perspective does the AI convey? In other words: Are the selected theories/models/approaches appropriate and scientifically sound, or does the AI address irrelevant or unsuitable approaches for the topic?

•Which groups, contexts, or theories might be systematically underrepresented?

•Did the AI suggest stereotypical or distorted assumptions?

•Are there normative terms in your topic (e.g., efficiency, success, quality, innovation,

3. AI Recommandation by FHM for Students and Teachers

Data Privacy/Copyright

- How did you avoid inputting personal data or data belonging to others?
- How did you ensure that you did not input copyrighted data into the AI?

Learning Process and Competence Development

- What were you able to handle better with the help of AI (understanding, structure, methodology, language)? What worked well when using AI?
- What would you do differently in hindsight regarding your use of AI?

- The requirements for reflecting on the use of AI are determined by the examiner

3. AI Recommandation by FHM for Students and Teachers

What should you consider when using generative AI?

- AI can be used for idea generation and structuring, including developing topics, outlines, analyzing academic literature to identify connections and research questions, and designing research methodologies.
- AI can assist with literature research and content summarization by identifying relevant studies and concisely presenting their content. This simplifies understanding the state of research and creating literature reviews. AI can also summarize your own work.
- AI can serve as a tool for phrasing and text correction, suggesting alternative formulations, checking coherence, grammar, and style, providing feedback on linguistic quality, and identifying potential weaknesses in arguments.
- In empirical research and data analysis, AI can support data interpretation, create visualizations, and suggest ways to present results.
- AI can help ensure correct citation and reference management to meet academic standards.
- Currently, many AI tools provide results of limited reliability, but when applied critically, they can still offer valuable support and streamline workflows.

https://www.fhm-campus.de/ki-fhm/richtlinien-zur-nutzung-von-ki/

Myths About AI in Education

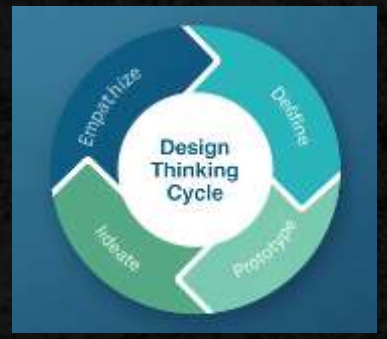
Myth	Reality	Evidence
AI replaces teachers	AI augments teaching, allowing educators to focus on mentoring and critical thinking	McKinsey 2026 study shows teachers spend more time on mentoring when using AI [28]
AI makes cheating easier	AI detection tools and educational policies reduce plagiarism and promote ethical use	51% of students use AI tools, but institutions implement guidelines and detection methods [29]
AI is unbiased	AI inherits and can amplify biases from training data, requiring ongoing auditing	Studies show gender and racial bias in loan algorithms and facial recognition [30]
AI is only for tech-savvy users	AI tools are designed for broad accessibility, but literacy programs are needed	EU's DigComp 2.2 framework promotes AI literacy across disciplines [31]

CASE STUDY: EUROPEAN UNIVERSITY VIADRINA (GERMANY)

AI:KI PROJECT HIGHLIGHTS

30% increase in faculty AI literacy achieved in 2024 through structured training programs and workshops.

AI-enhanced curricula developed across 12 disciplines, integrating didactic AI tools into teaching practice.



VRIJE UNIVERSITEIT AMSTERDAM DT4AI PROJECT

KEY ACHIEVEMENTS

Practice-based AI education combining AI, Design Thinking, and Innovation methodologies for real-world application.

90% student satisfaction rate achieved. Strategic partnerships established with 15+ leading tech companies.

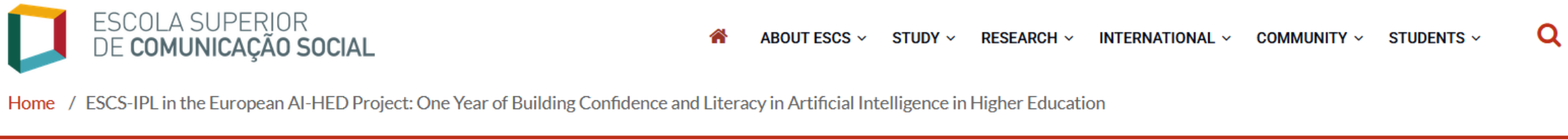
ESCS-IPL PORTUGAL: AI-HED PROJECT

AI-HED ACHIEVEMENTS

First AI competency framework developed in Portuguese higher education, setting national standards for AI integration.

40% increase in cross-disciplinary AI projects with strong focus on ethics and institutional readiness.

2. Equipping Learners for a Technology Powered Ecomony



- https://www.escs.ipl.pt/en/editoriais/escs-ipl-european-ai-hed-project-one-year-building-confidence-and-literacy-artificial

4. Equipping Learners for a Technology Powered Ecomony

Concrete outcomes after the first year
Among the project's main outcomes is the **AI Starter Kit**, a practical resource designed to support lecturers in understanding AI and integrating it pedagogically. Tested across all partner institutions, the Starter Kit has helped reduce anxiety around AI and increase lecturers' confidence by prioritising concrete and applicable examples.

In 2025, the project also delivered a series of **training sessions** and **workshops**, involving around 40 lecturers across Europe and 24 courses. These collaborative moments enabled in-depth discussion of issues central to ESCS-IPL, such as ethics, assessment, academic integrity, creativity and the role of the lecturer in AI-supported learning environments.

In parallel, **24 pilot courses** were designed and implemented, in which AI was integrated without altering the original learning outcomes, instead supporting the teaching process as a learning partner, feedback tool, writing aid or analytical resource.

At ESCS, during the first semester of the 2025/2026 academic year, **eight pilot courses** are currently being implemented, involving **eight lecturers from different areas of expertise** within the school.

https://www.escs.ipl.pt/en/editoriais/escs-ipl-european-ai-hed-project-one-year-building-confidence-and-literacy-artificial

AI-HED
Artificial Intelligence in Higher Education Teaching and Learning

Adopting AI in teaching: Guidelines for course development

Dietmar Paier, UAS BFI Vienna

These guidelines were developed in work package 3 of the AI-HED project. The author expresses his gratitude and appreciation to all experts and to all members of the AI-HED project who have greatly contributed to the development of this document. Any shortcomings or errors remain the sole responsibility of the author.

https://ai-hed.eu/downloads/AI-HED_WP3_Guidelines_course_development_final_Feb14_2025.pdf

SPHERE
Support and Promotion for Higher Education Reform Experts

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Method	Approach	Implementation
Observe-Question-Compare (OQC)	Analyzing an AI output by examining its details and comparing its information with an authoritative source	**Observe:** Identify and examine the features of the AI output, even if they feel self-evident. For instance, ask 'How many different aspects are addressed in the output?' **Question:** Critically evaluate every aspect of the output by asking questions such as: Is the AI-generated information true and accurate? Is it relevant? Is it fair? **Compare:** Let students compare AI output with other credible sources of information, e.g. textbooks, journal articles, descriptions of good practices, professional association information, or market research data.

https://ai-hed.eu/downloads/AI-HED_WP3_Guidelines_course_development_final_Feb14_2025.pdf

Review-Evaluate-Reprompt (RER)	Defining the quality standards for a specific task and evaluating AI outputs based on those criteria.	**Review Criteria:** Define (also in collaboration with your students), what constitutes a quality, desirable, or "good" output? This could include specificity, context, organization, clarity, usability, format, limitations, and other factors. **Evaluate**: What are the gaps between the defined criteria and the AI-generated output? What has the AI added, deleted, or modified? What advice does it offer for improvement, based on the feedback it provides? What might AI not be able to improve, given its inherent limitations? **Refine the Prompt:** Use the identified criteria to craft more detailed or specific instructions for the AI. Regenerate the output with a refined prompt, or decide to stop prompting and make the necessary changes manually.

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Ideas-Connections-Extensions (ICE)	Generating ideas, making connections between them, and extending them into new applications	**Ideas:** Generate initial ideas on the questions to be answered or problems to be solved using AI. For example, what potential solutions could help reduce plastic waste in the community? **Connections:** Identify and explore connections between these ideas and the insights gained from AI. For example, how can these solutions be integrated with existing recycling programs or community initiatives? **Extensions:** Extend these ideas into broader applications using AI for further research. For example, how can these solutions be scaled up or adapted for other environmental issues?

Table 2: 3 Approaches to Critical Thinking (from Paulson 2024, with minor adaptations)

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4. Equipping Learners for a Technology Powered Ecomony

Relevance for Assesment:

• First, to prevent students from passing off AI-generated work as their own. This requires cross-referencing documentation and ensuring transparency.
• Second, design assignments and examinations in such a way that the use of AI is documented in a way that it is possible to distinguish between AI-generated and independent performance parts.
• Third, to develop examination methods that require students to practically demonstrate the knowledge and skills they have acquired, as well as to explain the solutions they have developed components.

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4. Equipping Learners for a Technology Powered Ecomony

Documentation of AI Use

•which AI tools they used (name and version),
• the purpose for using one or more AI tools (e.g, generating ideas for study and assessments,
paraphrasing and summarising sources, translating or optimizing text, developing presentations etc.)
• Provide feedback on your ideas and work, and help you improve it
• the prompts, follow-up prompts, and other inputs provided to the tool,
• and how they adopted the AI output in their assignments, examinations, or theses

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tools

Category

Search Tool and Description...

Tool	Description	Category	Example
3DGPT	Authentise 3DGPT is an AI-powered tool designed to streamline additive manufacturing by offering instant, intelligent insights and solutions. It combines GPT-driven natural language processing with real-time manufacturing data to enhance decision-making, improve workflows, and reduce operational complexity in 3D printing processes.	Simulations and Interactive Learning	3DGPT allows teachers to interact with 3D models throu conversational queries, making complex concepts accessible. In higher education, educators can use it to demonstrate intricate designs or mechanical component in disciplines like engineering, architecture, and science enabling real-time analysis, visualization, and enhanced

https://ai-hed.eu/resources/ai-tools-list/

ASU Online courses that immerse students in AI

Many ASU Online courses are building AI literacy into the student experience. Below are a few examples of courses ASU faculty are teaching that are actively integrating AI into their assignments and learnings:

- **UXP 424: Information Architecture**
  - Taught by Williams, this course explores the knowledge structures of websites, apps and other interactive media, covering the main pillars of information architecture such as structure types, organization schemes, labeling, logic and navigation patterns. The course leans directly into AI adoption by having students use it for every assignment. The course follows “a structure where assignment sequences first ask students to employ AI, then apply human reasoning to related tasks and last to combine both human and AI on more complex assignments or tasks,” Williams says.
- **PSY 494: AI Ethics**
  - Taught by Reardon, this course explores the ethical implications of integrating AI technologies into research and practice in social and behavioral sciences. Students examine critical considerations such as bias, fairness, privacy, data security, accountability, transparency and human-AI interaction. "This course helps [students] see that [AI] ethics is not abstract, it is something they actively practice as they evaluate outputs, question assumptions, and make decisions in real time,” Reardon explains.

https://asuonline

EU ALIGNMENT

How can Montenegrin universities align with appropriate AI standards?

ETHICS

What ethical frameworks are essential for AI in higher education?

BALANCE

How to balance innovation and academic integrity in AI use?

DISCUSSION QUESTIONS

ENGAGE WITH KEY QUESTIONS

Let's explore these critical questions together and share perspectives on AI in higher education.

The Transformation of Higher Education in the Age of AI

From Classrooms to Learning Ecosystems

- **Content:**
  The higher education landscape is undergoing a **paradigm shift**, driven by **AI, digitalization, and global complexity**. Traditional models of knowledge transfer are being replaced by **dynamic, learner-centered ecosystems** that prioritize adaptability, collaboration, and real-world problem-solving.
- **Key Drivers:**
  - **AI as a Catalyst:** Personalized learning, adaptive assessments, and AI-driven content creation are redefining pedagogy.
  - **Global Challenges:** Climate change, digital divides, and labor market disruptions demand **agile, future-proof curricula**.
  - **Human-AI Symbiosis:** The role of educators is evolving from knowledge providers to **AI coaches, ethical guardians, and lifelong learners** (Treidel, 2026).
- **Montenegrin Context:**
  Bridging the digital divide requires **investment in infrastructure, faculty upskilling, and equitable access** to AI tools.

AI's Role in the Future Classroom

AI as Enabler, Not Replacer

1. **Personalized Learning:**
    1. Adaptive platforms (e.g., **Jill Watson at Georgia Tech**) tailor content to individual needs, improving engagement and outcomes.
2. **Virtual Labs & Simulations:**
    1. Safe, scalable experimentation in **STEM, social sciences, and design thinking** (e.g., ETH Zurich's digital labs).
3. **Assessment & Analytics:**
    1. AI-driven tools (e.g., **Gradescope, Turnitin**) provide real-time feedback and detect plagiarism, but require **ethical oversight**.
4. **Collaborative Tools:**
    1. Platforms like **Miro or Padlet** foster creativity and teamwork in hybrid settings.

- **Critical Question for Montenegro:** *How can we ensure AI **enhances human interaction** rather than replacing it?* **UNESCO Insight:**
  AI must be **ethical, inclusive, and transparent**—aligned with the AI Competency Framework for Students.

Competency Frameworks for the AI Era

Building AI Literacy: From Users to Creators

To thrive in the AI era, students and educators need a **holistic competency framework**:

- **1. Human-Centered Mindset:**
  - Understand AI's **limitations and biases**; assert agency over technology (OECD, 2023).
- **2. Ethical AI Use:**
  - Teach **ethics-by-design**, data privacy, and responsible innovation (EU DigCompEdu).
- **3. Technical Foundations:**
  - Basic AI concepts (e.g., machine learning, NLP) and **applied tools** (e.g., Python, AI chatbots).
- **4. Design Thinking & Problem-Solving:**
  - Use AI for **creative solutions** (e.g., hackathons, virtual exchange projects).
- **Policy Link:**
  Montenegro's universities should adopt the **UNESCO AI Competency Framework** to align with global standards.

Institutional Readiness & Partnerships

Beyond Technology: Infrastructure and Collaboration

University Readiness requires **three pillars**:

1. **Infrastructure:**
    1. **Reliable connectivity**, LMS platforms (e.g., Moodle), and **cybersecure collaboration tools**.
    2. **Hybrid spaces:** Labs, studios, and incubators for project-based learning.
2. **Partnerships:**
    1. **Public-Private Collaboration:** Work with EdTech startups (e.g., **Rinova's Karamel Arts Centre**) for pilot programs.
    2. **Regional Ecosystems:** Integrate with **science parks and start-up incubators** (e.g., EU's Digital Innovation Hubs).
    3. **International Mobility:** Joint degrees and virtual exchanges with EU/Erasmus+ networks.
3. **Governance:**
    1. **Data privacy regulations** and **accessibility standards** must be core design principles.

- **Montenegrin Opportunity:**
  Leverage **Erasmus+ Micro-Credentials** to offer **AI-focused short courses** for upskilling.

Call to Action – Shaping the Future Together

From Vision to Reality: A Roadmap for Montenegro

- **Content: For Educators:**
  Pilot AI tools in classrooms (e.g., AI tutors, simulation software).
  Adopt **UNESCO's ethical guidelines** and **EU's DigCompEdu** framework.
- **For Policymakers:**
  Fund AI literacy programs and **regulate EdTech data privacy**.
  Invest in **infrastructure and faculty training** (e.g., through **EU Digital Education Action Plan**).
- **For Students:**
  Demand active learning—use AI to **create, not just consume**.
  Participate in **hackathons, internships, and virtual labs** to bridge theory and practice.
- **Final Reflection:** *"The future classroom is not a place, but a **mindset**—flexible, inclusive, and powered by human-AI collaboration.*