Uniwersytet Komisji Edukacji Narodowej w Krakowie

Krakowskie Forum AI w Edukacji

Od badań do praktyki szkolnej

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The Human Being in the Age of AI: A Humanistic Model of Future Competences



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AI Transforms Not Only Tools but Also (Neuro)Cognitive Practices



Generative AI is not merely another digital tool. It is transforming the ways in which students search for information, produce texts, solve problems, and evaluate knowledge.

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The Changing Role of the Teacher: From Knowledge Provider to Learning Designer

- a designer of learning experiences;
- a facilitator of critical inquiry;
- a mediator of human–AI interaction;
- a mentor supporting reflection and autonomy;
- an ethical guide;
- a validator of learning outcomes.

AI does not diminish the importance of teachers. On the contrary, it increases the importance of their pedagogical, relational and ethical competences. UNESCO identifies AI pedagogy and AI for professional learning as two distinct areas of teacher competence.

Human–AI Interaction as a New Educational Relationship

- The quality of human–AI interaction depends not only on technological competence, but also on **critical judgement**, **emotional awareness**, **relational competence** and the ability to maintain **human agency**.

Challenges:

- trust and overtrust in AI;
- anthropomorphisation of AI;
- emotional attachment to AI systems;
- perceived authority of AI-generated answers;
- human responsibility in AI-assisted decisions;
- the boundaries between human and artificial agency.

From AI-Assisted Learning to AI-Enhanced Learning

- AI should support cognitive development, not replace the cognitive effort required for learning.

AI-assisted learning	AI-enhanced learning
AI provides answers	AI supports inquiry
AI generates content	Students critically transform content
AI completes tasks	Students solve problems
Focus on the output	Focus on the learning process
Cognitive offloading	Cognitive augmentation

Rethinking Assessment in the Age of Generative AI

- From assessing products to assessing learning processes.
- From final answers to reasoning and justification.
- From individual output to documented human–AI collaboration.
- From memorisation to critical evaluation and transfer of knowledge.
- From declarations of competence to demonstrated competence.

DigCOM 3.0: European Framework

1. **Information search, evaluation and management** 1.1 Browsing, searching and filtering; 1.2 Evaluating information; 1.3 Managing information
2. **Communication and collaboration** 2.1 Interacting; 2.2 Sharing; 2.3 Digital citizenship; 2.4 Collaborating; 2.5 Digital behaviour; 2.6 Managing digital identity
3. **Content creation** 3.1 Developing digital content; 3.2 Integrating and re-elaborating content; 3.3 Copyright and licences; 3.4 Computational thinking and programming
4. **Safety, wellbeing and responsible use** 4.1 Protecting devices; 4.2 Protecting personal data and privacy; 4.3 Supporting wellbeing; 4.4 Protecting the environment
5. **Problem identification and solving** 5.1 Technical problems; 5.2 Needs and technological responses; 5.3 Creative solutions; 5.4 Developing digital competence

Research Agenda: Human Competences in the Age of AI

- Main fields:

Cognitive autonomy	Does AI use influence independent reasoning and problem-solving?
AI literacy	How accurately do students assess their own AI competences?
Human–AI relations	How do trust and anthropomorphisation affect AI use?
Educational environments	How do schools and families shape AI competence development?
AI and well-being	What is the relationship between AI use, digital well-being and psychological resilience?
Assessment	How can AI competence be measured through practical tasks rather than self-reports?
Social inequalities	How do socioeconomic and cultural factors influence AI competence development?

A New Challenge for Schools: Students May Know How to Use AI Without Knowing How to Think

- AI literacy ≠ the ability to use ChatGPT

- Students should be able to:- Understand what AI is;- Recognise its capabilities and limitations;- Evaluate the reliability of AI-generated outputs;- Identify errors and hallucinations;- Understand issues of authorship and attribution;- Protect their privacy;- Make ethical decisions;- Maintain their own cognitive engagement and agency;- Use AI creatively;- Recognise when AI should not be used.

Human-centred AI competence

- AI competencies should not be regarded as an autonomous set of technical skills, but rather as an extension of media, digital, information, social, and ethical competencies.

- The so-called foundational competencies also include communication, linguistic, and social skills.

3 aspects of competences

- **Declared competence –** what individuals believe they can do.
- **Demonstrated competence –** what individuals can actually do in practical tasks.
- **Adaptive competence –** how individuals respond to new, uncertain and changing AI-related situations.

HUMAN-CENTRED MODEL OF AI COMPETENCCE

The development of AI competencies and non-digital competencies among young adults in an algorithmic society

1. MACRO-LEVEL CONTEXT – ALGORITHMIC CULTURE

- Platformisation and Digital Infrastructures
- Datafication of Social Life
- Algorithmisation of Decision-Making Processes
- Attention Economy and Information Selection
- Automation and AI Systems (Generative AI)
- Cultural Norms, Values, and Educational Policies
- Digital Inequalities, Barriers and Exclusion

2. THEORETICAL PERSPECTIVE

- **Algorithmic Culture** (Striphas, van Dijck, Couldry)
- **Extended Cognition and Outsourcing** (Clark, Hutchins, Sloman)
- **Critical Media Education** (Freire, Jenkins, Buckingham, Selwyn)
- **Human–AI Relationship** (Turkle, Floridi, Han)
- **Relational Competence as a Foundation** (WHO, OECD, EU)

3. COGNITIVE LEVEL – EXTENDED COGNITION

Cognitive functions and tasks supported by AI:

- Memory
- Information retrieval
- Analysis and interpretation
- Text generation
- Decision-making
- Creativity
- Problem-solving



Consequences for Individuals:

- Changes in thinking processes
- Cognitive offloading
- Reduced cognitive autonomy
- Changes in concentration and memory
- Changes in learning processes
- Potential weakening of cognitive autonomy

4. EDUCATIONAL LEVEL – CRITICAL MEDIA EDUCATION

Spiral Education (3 Loops):

- Developing the same skills at progressively higher levels
- Increasing awareness
- Deepening reflection
- Developing critical thinking
- Developing responsibility and competencies

Key Educational Approaches:

- Critical Reflection
- Media and AI Analysis
- Ethics and Responsibility
- Social and Cultural Awareness

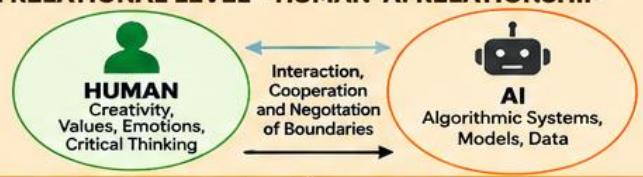
Educational Effects:

- Conscious and critical use of AI
- Resistance to misinformation
- Understanding AI mechanisms
- Awareness of social consequences
- Readiness for responsible action

5. RELATIONAL LEVEL – HUMAN–AI RELATIONSHIP

Dimensions of the Relationship:

- Trust in AI
- Anthropomorphisation of AI
- Emotional and affective engagement
- Sense of agency
- AI as a cognitive assistant
- Negotiation of responsibility



Effects of the Relationship:

- Satisfaction with AI-assisted work
- Perceived effectiveness
- Emotional monitoring
- Manipulation
- Changes in interpersonal
- relationships and social functioning

6. INDIVIDUAL LEVEL – AI COMPETENCIES (13 CORE DOMAINS)

1. Knowledge of AI and Its Mechanisms
2. General and Practical Use of AI
3. Information Verification and Evaluation of AI
4. Identification of AI-Generated Content
5. Prompting and Goal-Oriented Use of AI
6. Ethical and Responsible Use of AI
7. Strategies, Forms and Competencies of AI Use
8. Emotional and Psychological Aspects of AI Use
9. Self-Reflection and Self-Assessment
10. Barriers and Limitations in the Use of AI
11. Perceived Effectiveness and Benefits of AI
11. Perception and Society
12. AI in Culture and Society
13. Attitudes Towards AI

7. NON-DIGITAL COMPETENCIES – THE FOUNDATION OF AI COMPETENCE

- Critical Thinking
- Problem-Solving
- Communication
- Collaboration
- Creativity
- Self-Reflection and Self-Awareness
- Ethics and Responsibility
- Cognitive Resilience

8. LONG-TERM OUTCOMES

- Autonomous Thinking and Cognitive Independence
- Ethical and Responsible Use of AI
- Lifelong Learning and Adaptive Competence Development
- Social Participation and Civic Engagement
- Preparedness for Future Work and Social Life
- Digital Well-Being and Psychological Resilience

9. INTERNATIONAL CONTEXT

- **International Comparative Context** (Poland – Spain – Portugal)
- **Multicultural Comparison**
- Similarities Between Educational Models and Representational Content
- Analysis of Cultural and Systemic Differences
- Shared Conclusions and Recommendations

LEGEND

- Direct Influence
- Indirect Influence
- Feedback Loop
- Spiral Process
- Macro-Level Context
- Cognitive Level
- Educational Level
- Relational Level
- Individual Level
- Foundation
- Outcomes

AI competencies are not a substitute for non-digital competencies, but an extension of human cognitive, social and ethical capacities.
Their development depends on the interaction between individual competencies, educational environments and the broader algorithmic society, with the ultimate goal of preserving human agency, cognitive autonomy and responsibility.

Key International Policy Documents

- My model is situated within the current international debate on AI and education, while also offering its own distinctive research perspective.
- - **UNESCO – AI Competency Framework for Students (2024).** UNESCO identifies four dimensions: a human-centred mindset, the ethics of AI, AI techniques and applications, and AI system design. The framework also emphasises progression from understanding AI, through using it, to creating AI-based solutions.
- - **UNESCO – AI Competency Framework for Teachers (2024).** The framework addresses, among other areas, a human-centred mindset, AI ethics, the foundations and applications of AI, AI pedagogy, and the use of AI for teachers' professional development.
- - **European Commission – Ethical Guidelines on the Use of AI and Data in Teaching and Learning for Educators.** An updated version of the guidelines was published in 2026. It addresses, among other issues, the AI Act, the GDPR, the ethical use of data, and practical scenarios for the application of AI in education.
- - **Council of Europe – Recommendation CM/Rec(2026)12 on Artificial Intelligence Literacy.** This is a particularly relevant document for my presentation. It links AI literacy with human rights, human dignity, democracy, the rule of law, autonomy, well-being, and social agency. It views education as an integral component of democratic infrastructure.

The Technocratic Model versus the Human-Centred Model

AI-turn?

Technocentric Model	Human-Centred Model
“How to use AI?”	“Why use AI?”
Efficiency	Meaning
Speed	Reflection
Automation	Autonomy
Generation	Creation
Output	Process
Tool	Human–Technology Relationship

The Main Ontological Assumption of the Model

- AI competencies are not merely a set of technical skills, but rather a complex humanistic and social construct whose development depends on the interaction between individuals, technology, the social environment, algorithmic culture, and the educational system.
- The model is based on the assumption that AI is not an isolated technology, but an integral part of a broader environment encompassing: Platformisation → Datafication → Algorithmisation → Attention Economy → Automation → Cultural Norms → Digital Inequalities
- Consequently, individual competencies are shaped by the structure of the digital environment in which AI is used.

The Main Ontological Assumption of the Model

- AI is transforming the conditions of human cognition. The central concept of the model is **“extended cognition.”**
- The model therefore assumes that AI is becoming an integral part of the human cognitive environment.
- AI can support human cognition, but it can also lead to:
- **Cognitive offloading → Reduced independent information processing → Cognitive dependency → Loss of cognitive autonomy**
- The model thus highlights a fundamental relationship: **AI can simultaneously enhance human cognitive capabilities and create the risk of undermining human cognitive autonomy.**

Non-Digital Competencies as the Foundation of AI Competence

- Non-digital competencies constitute the foundation upon which AI competencies are built.
- The foundational layer comprises: CRITICAL THINKING – PROBLEM-SOLVING – COMMUNICATION – COLLABORATION – CREATIVITY – SELF-REFLECTION – ETHICS AND RESPONSIBILITY – COGNITIVE RESILIENCE
- The model assumes that the more AI takes over certain cognitive operations, the more important those competencies become that AI should not fully replace.
- This relationship can be expressed as follows: Non-Digital Competencies → Quality of AI Competencies → Human Autonomy in the Human–AI Relationship
- Consequently, AI competencies are not conceived as an alternative to humanistic competencies, but rather as an extension of them.
- This approach is consistent with contemporary UNESCO frameworks, which place a human-centred mindset, human agency, and human accountability at the very core of AI competence.

AI competencies are multidimensional in nature.

- The model identifies 13 domains of AI competence. However, these should not be regarded as 13 entirely independent skills.
- They are interconnected through a common underlying logic: Knowledge → Evaluation → Action → Reflection → Responsibility
- This means that AI competence is integrative in nature.
- It is not enough to know what AI is. It is also necessary to:- understand how it works;- evaluate its outputs;- recognise its limitations;- understand the associated risks;- make informed decisions;- anticipate the consequences;- regulate one’s own behaviour;- retain responsibility for the outcomes of AI-assisted actions.
- This approach is consistent with contemporary understandings of AI literacy as a multidimensional construct encompassing not only technical knowledge but also critical, ethical and social competencies.

The AI Competence Model and Its Developmental Trajectories

- **Trajectory A –** Constructive: non-digital competences → AI competences → critical evaluation → conscious collaboration with AI → cognitive enhancement → autonomy → responsible use of AI.
- **Trajectory B –** Risky: low levels of non-digital competences → unreflective use of AI → cognitive offloading → dependence on AI → weakening of independent thinking → loss of cognitive autonomy.

The Human Being in the Age of AI

A Humanistic Model of Future Competences

AI transforms human cognition — and calls for a new balance between opportunity and responsibility.

Neurocognitive Dimension
How AI affects the mind

- **Memory & Knowledge Consolidation**
  Will we truly learn?
- **Attention & Executive Functions**
  Will we stay focused?
- **Metacognition & Self-Regulation**
  Will we monitor our thinking?
- **Emotion & Motivation**
  Will we embrace the effort?
- **Cognitive Autonomy & Neuroplasticity**
  Will we remain in control?



Human–AI Cognitive Interaction
Cognitive Augmentation ↔ Cognitive Offloading

Human-Centred Competences
What we need to develop

- **AI Literacy** (knowledge, critical thinking)
- **Ethical Reasoning** (responsible use)
- **Digital Well-Being** (balancing risks and benefits)
- **Agency & Self-Determination** (making informed choices)
- **Social Responsibility** (using AI for the common good)

Key Research Question

"Does AI extend human cognitive capabilities, or does it gradually replace the cognitive effort necessary for their development?"

The Humanistic Goal
A self-aware, resilient and responsible person in the AI era

- Cognitive Agency
- Adaptive Competence
- Human Dignity
- Democratic Participation

The Balanced Future

- ✓ Harness the benefits of AI
- ✓ Mitigate the risks of dependence
- ✓ Foster neurocognitive agency
- ✓ Build a humane and inclusive digital society

10 Key Theoretical Theses

- **Thesis 1:** AI literacy is a multidimensional construct encompassing cognitive, technical, ethical, social, cultural, and psychological components.
- **Thesis 2:** AI competences are rooted in non-digital competences; they do not replace them.
- **Thesis 3:** The impact of AI on human cognition is ambivalent: it can lead both to cognitive enhancement and to cognitive offloading.
- **Thesis 4:** Cognitive autonomy is one of the key criteria of mature AI use.
- **Thesis 5:** The quality of human–AI interaction depends more on the user's level of competence and reflexivity than on the frequency of AI use itself.
- **Thesis 6:** Critical education plays a mediating role between the algorithmic environment and the development of AI competences.
- **Thesis 7:** AI competences are dynamic and adaptive in nature and require continuous development.
- **Thesis 8:** The human–AI relationship is simultaneously cognitive, functional, social, and psychological.
- **Thesis 9:** The development of AI competences is shaped by cultural, educational, and social contexts.
- **Thesis 10:** The ultimate goal of AI competences is not to maximise the use of AI, but to preserve human agency, cognitive autonomy, and responsibility.

13 Domains of AI Competence – Three Layers

- - 1. Operational Competences: Knowledge of AI, use of AI tools, source verification, distinguishing AI-generated from human-generated content, strategies and habits.-
- 2. Regulatory Competences: Self-reflection, self-assessment, identifying barriers, managing AI use, and safety.
- - 3. Humanistic / Axiological Competences: Ethics, responsibility, creativity, culture, and attitudes towards AI.

Five Recommendations for Human-Centred AI Education

1. Integrate AI literacy across the curriculum.

AI education should not be restricted to computer science or technology-related subjects.

2. Prioritise human agency and cognitive autonomy.

Students should learn to think with AI, but also independently of AI.

3. Redesign teaching and assessment practices.

Educational assessment should focus on reasoning, reflection, verification and demonstrated competence.

4. Invest in teachers' professional development.

Teachers need pedagogical, ethical, relational and practical AI competences.

5. Build inclusive and supportive AI learning environments.

Families, schools, universities and public institutions should share responsibility for developing AI literacy.

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1. UNESCO (2024), AI Competency Framework for Students.
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Thank you

Questions and discussion



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