AI usage in education and learning process

Module 4 – Part 1

Name, date, location

Digital4All

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them. Project number: 2023-1-FI01-KA220-HED-000152599

Co-funded by the European Union

AI usage in education and learning process

- 3 Parts of Course
  - Part 1 - Theoretical
  - Part 2 - Theoretical and Practical
  - Part 3 - Practical

Co-funded by
the European Union

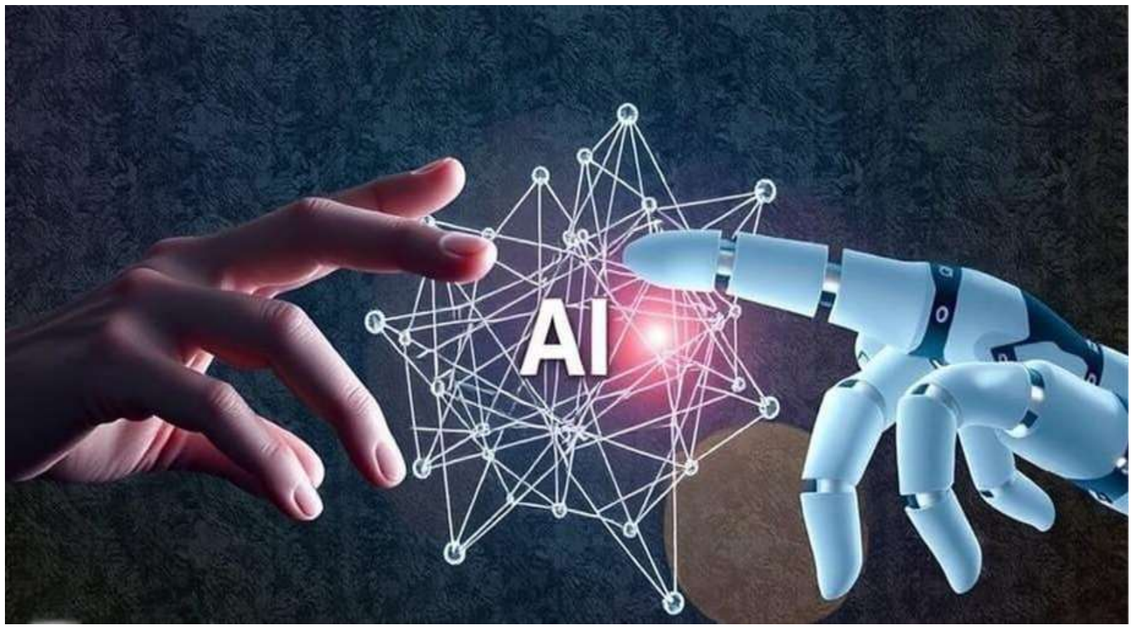
AI usage in education and learning process

- Course Objectives
  - Understand AI in digitally inclusive education
  - Learn about the ethical use of AI
  - Engage in active AI usage
- Course Outcomes
  - Identify the role of AI in education
  - Understand and manage risks while using AI tools in education
  - Trial use of AI tools, evaluation of experience, and results

Co-funded by
the European Union

Part I - Content

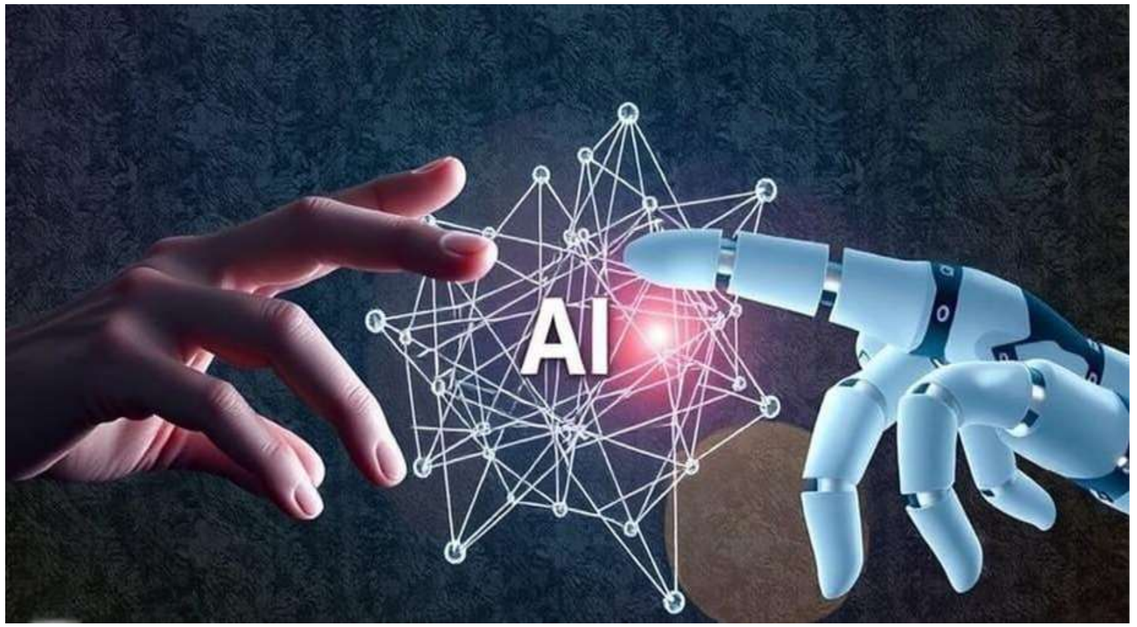
- Introduction to AI
- AI in Digitally Inclusive Education
- Challenges in Implementing AI for Inclusivity
- Ethical Considerations in AI Use



Co-funded by
the European Union

Before start, please complete the short knowledge test

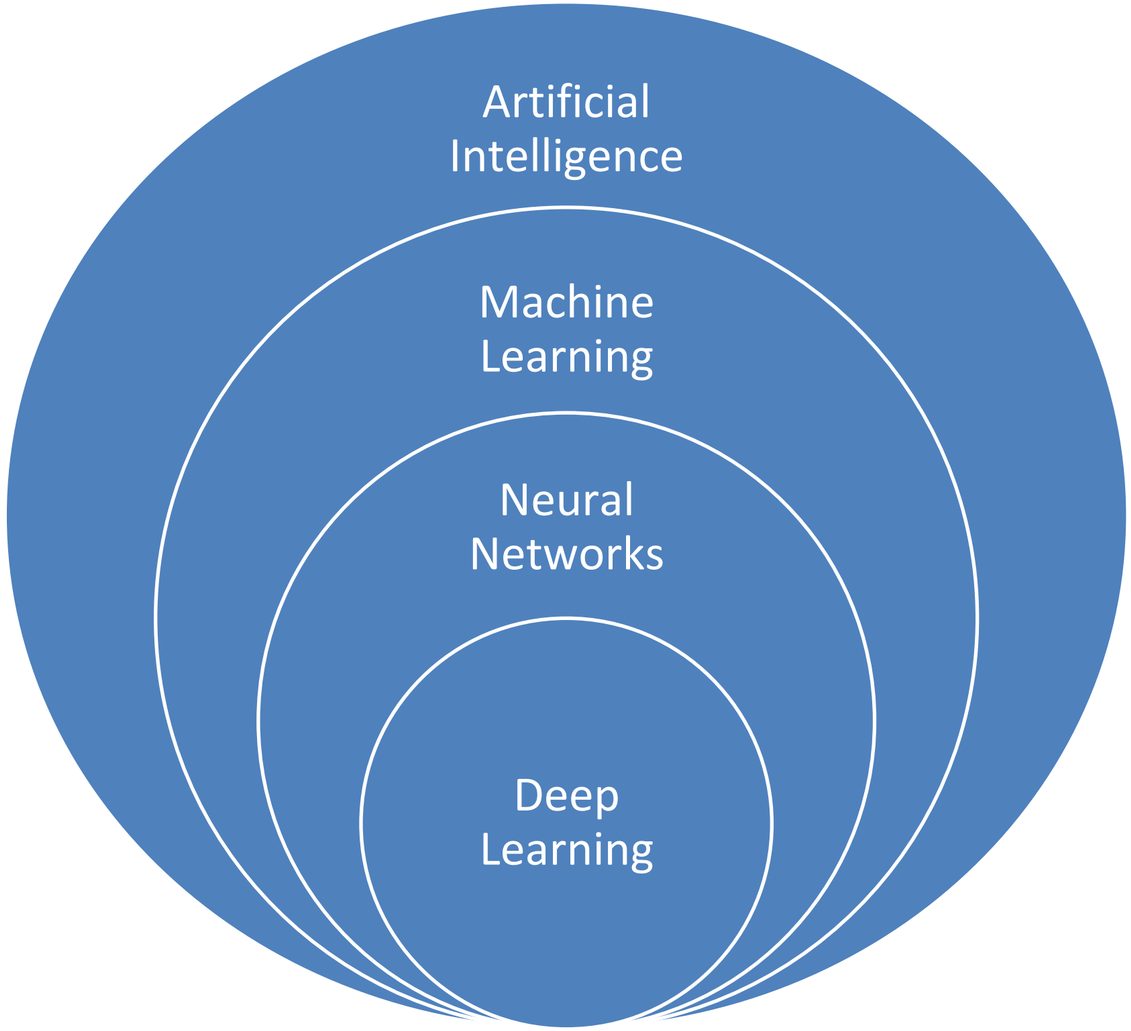
https://forms.gle/pFD9yizjiqJ4hmmi6



Co-funded by
the European Union

Introduction to AI

- What is AI?
  - **Definition:** Artificial Intelligence (AI) refers to computer systems that can perform tasks that typically require human intelligence (e.g., learning, reasoning, decision-making).
  - Components of AI
  - Characteristics of AI
  - Types of AI
  - Applications of AI
  - Ethical Considerations and Challenges



Co-funded by the European Union

Introduction to AI

- **Components of AI**
  - AI systems often rely on several interconnected technologies and methodologies:
  - **Machine Learning (ML)**: A subset of AI that uses algorithms to parse data, learn from it, and make decisions or predictions without being explicitly programmed.
  - **Natural Language Processing (NLP)**: Enables machines to understand, interpret, and respond to human languages.
  - **Computer Vision:** Allows machines to interpret and make sense of visual data from the world.
  - **Robotics:** Integrates AI into physical machines to interact with and manipulate their environment.
  - **Expert Systems:** Utilize a database of knowledge to make decisions or solve problems in specific domains.
  - **Reinforcement Learning:** A training paradigm where agents learn optimal behaviors through trial and error, guided by rewards or penalties.

Co-funded by
the European Union

Introduction to AI

- **Characteristics of AI**

  AI systems exhibit:

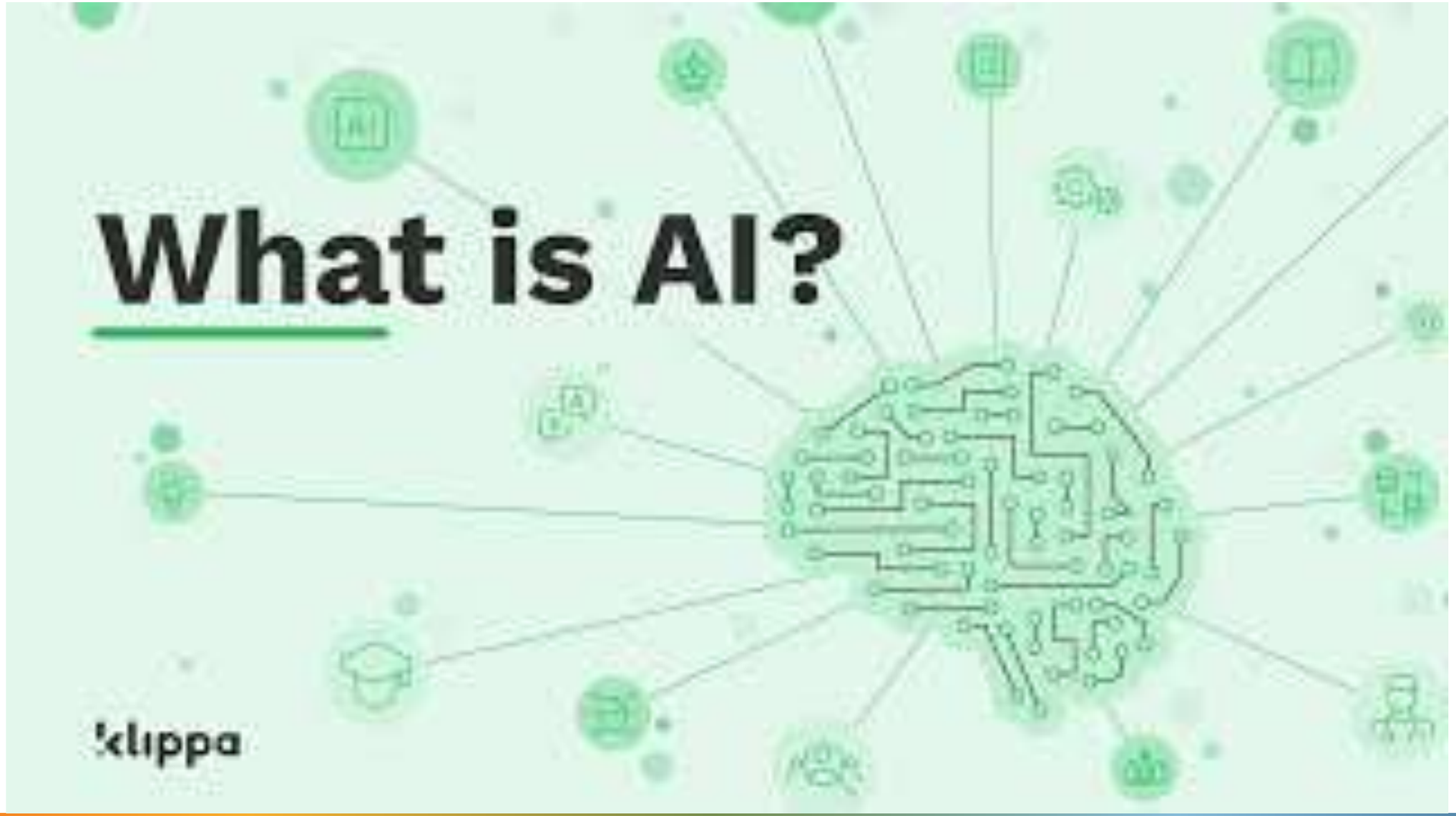
  - **Adaptability:** They can improve performance through learning from experience.
  - **Autonomy:** Some AI systems can operate independently without constant human intervention.
  - **Versatility:** Capable of being applied across domains, from healthcare to entertainment.

- **Types of AI**

  AI can be categorized by capability and function:

  - **Narrow AI (Weak AI)**: Designed to perform specific tasks
  - **General AI (Strong AI):** Hypothetical systems with the ability to perform any intellectual task that a human can do.
  - **Superintelligent AI:** A theoretical future AI with intelligence surpassing human capabilities across all fields.

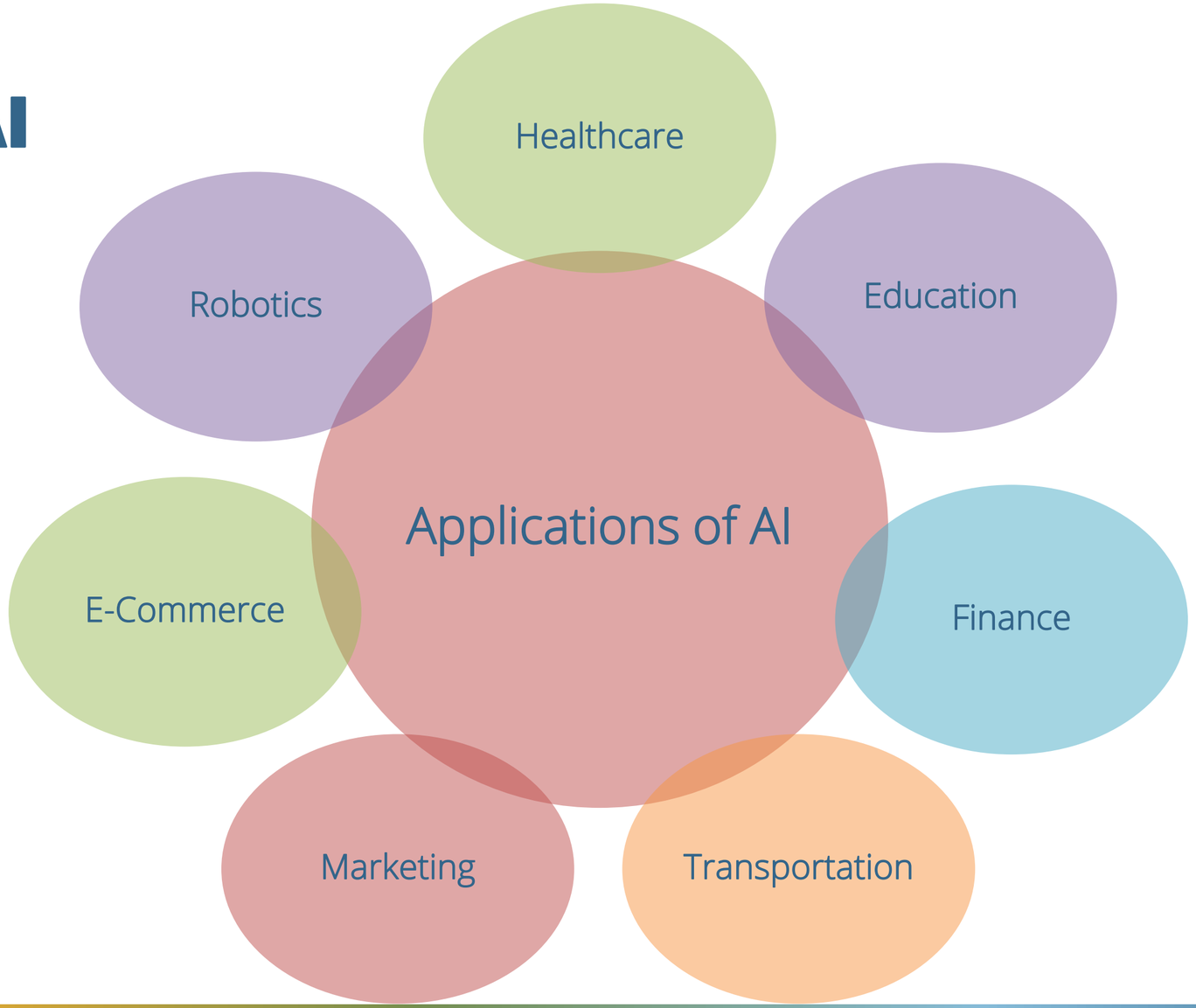
Co-funded by
the European Union



Co-funded by
the European Union

Introduction to AI

Applications of AI



Co-funded by
the European Union

Introduction to AI

- **Ethical Considerations and Challenges**

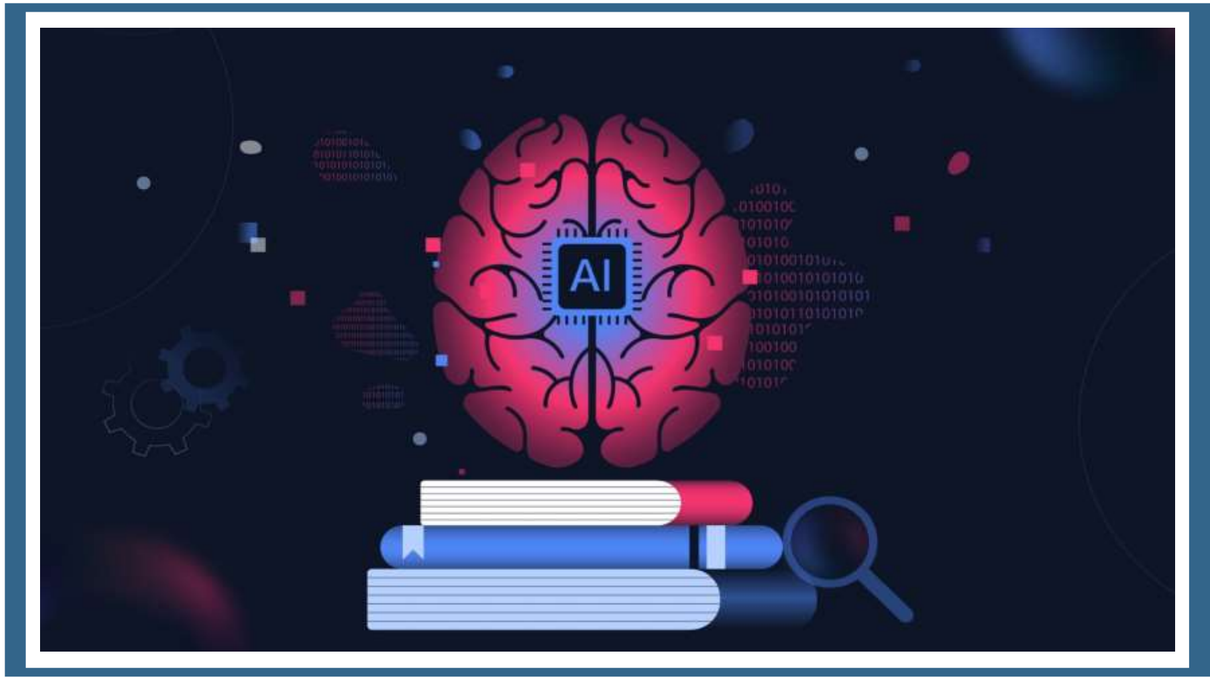
  AI raises significant ethical concerns:

  - **Bias and Fairness**: Ensuring AI systems do not perpetuate or amplify societal biases.
  - **Privacy:** Managing data responsibly to protect individual rights.
  - **Job Displacement:** Addressing the impact of automation on employment.
  - **Control and Accountability**: Determining responsibility for AI-driven decisions..

Co-funded by
the European Union

AI in Digitally Inclusive Education

- **Artificial Intelligence (AI)** has emerged as a transformative technology in education, enabling inclusive and equitable learning opportunities.
- **Digitally inclusive education** refers to creating an educational environment that caters to learners of all backgrounds, including those with disabilities, limited access to resources, or diverse linguistic and cultural needs.
- **AI technologies** can break barriers by personalizing learning experiences, improving accessibility, and fostering global connectivity.



Co-funded by
the European Union

AI in Digitally Inclusive Education

- AI tools help bridge gaps for students of varying abilities, locations, and backgrounds.
- Examples of inclusivity:
  - Assistive AI - AI tools assist students with disabilities by providing alternatives to traditional learning methods:
    - **Speech-to-text** systems aid students with hearing impairments.
    - **Text-to-speech** tools like Kurzweil 3000 support students with dyslexia.
    - **AI-powered eye-tracking** and **voice-recognition** tools facilitate interaction for students with motor disabilities.

Co-funded by
the European Union

AI in Digitally Inclusive Education

- Examples of inclusivity:
  - Personalized Learning: AI-driven adaptive learning systems assess individual learner needs, preferences, and progress. Tailoring content to students' needs, improving engagement.
  - Language Learning and Support for Multilingual, non-native speakers Learners: AI-based language translation and grammar correction tools help bridge language barriers. Real-time translation tools allow learners to access content in their native language

Co-funded by
the European Union

AI in Digitally Inclusive Education

- Examples of inclusivity:
  - Remote and Blended Learning: AI enhances virtual classrooms by providing intelligent tutoring systems (ITS) and automating administrative tasks like grading and attendance tracking.
  - Data-Driven Insights for Equity: AI can analyze vast datasets to identify educational inequities and recommend interventions. Predictive analytics detect at-risk students early, enabling timely support

Co-funded by
the European Union

AI in Digitally Inclusive Education

- Key Technologies in AI for Inclusive Education
  - **Machine Learning**:
    - Algorithms that improve with data (e.g., personalized learning).
    - Enables adaptive learning systems.
    - Predicts outcomes to tailor interventions.
  - **Natural Language Processing (NLP):**
    - Understanding and processing human language (e.g., chatbots, content summarization).
    - Enhances communication and translation.
    - Supports interactive chatbots for 24/7 assistance.

Co-funded by
the European Union

AI in Digitally Inclusive Education

- Key Technologies in AI for Inclusive Education
  - **Computer Vision:**
    - Interprets visual data for students with visual impairments.
  - **Speech Recognition:**
    - Assists with voice-to-text and automated note-taking.
  - **Automation:**
    - Tools for automating repetitive tasks like grading

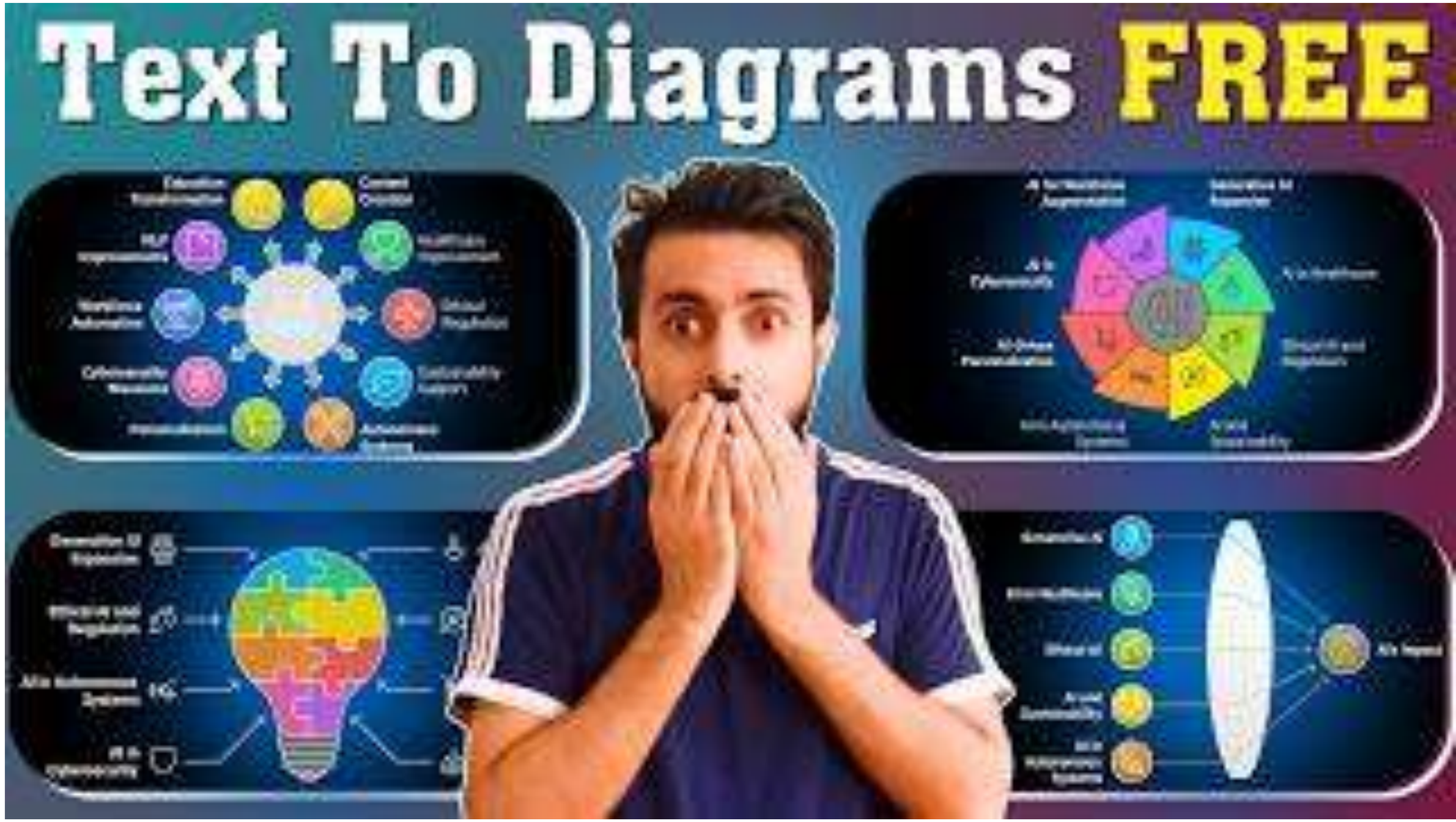
Co-funded by
the European Union

AI in Digitally Inclusive Education

- **Benefits of AI in Digitally Inclusive Education**
  - **Democratization of Education:** AI enables access to quality education regardless of geographical location or economic status.
  - **Support for Teachers:** By automating routine tasks, teachers can focus on creative and interpersonal aspects of teaching.
  - **Scalable Solutions:** AI systems can serve large populations without compromising quality, addressing global education challenges.

Co-funded by
the European Union

AI in Digitally Inclusive Education



Co-funded by
the European Union

Challenges in Implementing AI for Inclusivity

- **Digital Divide** :
  - Unequal access to AI-driven tools due to limited internet connectivity or hardware resources can exacerbate inequities. This gap can hinder the implementation of AI-driven tools, particularly in underserved and rural areas.

- **Bias in AI Models:**
  - AI systems can inadvertently replicate or amplify biases present in the data used to train them. These biases can result in unfair or discriminatory practices, particularly when applied to diverse and inclusive educational settings.

Co-funded by
the European Union

Challenges in Implementing AI for Inclusivity

- **Privacy and Ethical Concerns:**
  - AI systems require large amounts of data to function effectively, raising concerns about the collection, storage, and use of sensitive learner data.

- **Teacher Training and Integration:**
  - Educators often lack the training to effectively integrate AI tools into their classrooms, limiting their potential impact.

Co-funded by
the European Union

Challenges in Implementing AI for Inclusivity

- **AI-Powered Lifelong Learning**: AI will enable personalized learning pathways for reskilling and upskilling throughout life.

- **Ethical AI Frameworks:** Policymakers and developers will need to implement robust ethical guidelines to ensure fair and unbiased AI usage.

- **Global Collaborations:** Cross-sector partnerships will be essential to make AI tools accessible and scalable for inclusive education globally.

Co-funded by
the European Union

Ethical Considerations in AI Use

- **Ethics in AI:**

  “Ethics in AI involves examining the moral principles that guide the development and use of AI to ensure fairness, safety, and societal benefit.”

- **Bias and Fairness.**
  Key Considerations:

  - **Data Bias:** Ensuring diverse, representative datasets to prevent discrimination against minority groups.
  - **Algorithmic Transparency**: Developing methods to audit AI algorithms for bias.
  - **Impact**: Biased algorithms may lead to unfair treatment of individuals or groups, undermining public trust

Co-funded by
the European Union

Ethical Considerations in AI Use

- **Privacy and Surveillance:**

  AI technologies like facial recognition and predictive analytics often rely on vast amounts of personal data, raising privacy concerns.

  Key Considerations:

  - **Data Collection:** Implementing strict regulations for the collection, storage, and use of personal data.
  - **Surveillance Risks:** Balancing national security and privacy rights, particularly with mass surveillance tools.
  - **Informed Consent:** Ensuring users are aware of and agree to how their data is used

Co-funded by
the European Union

Ethical Considerations in AI Use

- **Accountability and Responsibility**

  As AI systems make decisions independently, questions arise about who is accountable for errors or harm.

  Key Considerations:

  - **Liability**: Clarifying the responsibility of developers, organizations, and users when AI systems cause harm.
  - **Decision-Making Transparency**: Providing clear explanations for AI-driven decisions, particularly in sensitive domains like healthcare and criminal justice.
  - **Ethical Oversight:** Establishing committees or frameworks to monitor and enforce ethical AI practices.

Co-funded by
the European Union

Ethical Considerations in AI Use

- **Accountability Human Rights and Inclusivity**

  AI applications should respect fundamental human rights and promote inclusivity.

  Key Considerations:

  - **Universal Accessibility:** Designing AI tools that are accessible to people with disabilities or those in underserved communities.
  - **Cultural Sensitivity:** Ensuring AI applications respect and adapt to different cultural contexts.
  - **Digital Divide:** Addressing disparities in AI access and infrastructure between developed and developing regions.

Co-funded by
the European Union

Ethical Considerations in AI Use

Co-funded by
the European Union

Ethical Considerations in AI Use

Strategies for Ethical AI Use

- Use tools that are transparent about their processes and data usage.
- Always involve human oversight to ensure fairness.
- Choose AI tools that comply with ethical guidelines and protect data privacy.

Interactive Activity

- What ethical challenges do you foresee in your context when using AI tools?
- Suggest ways to make a common AI tool (e.g., virtual assistants) more inclusive

Co-funded by the European Union

Digital4All

Do you have any questions?

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them. Project number: 2023-1-FI01-KA220-HED-000152599.

Co-funded by the European Union

Åbo Akademi experiencelab

University of Nicosia

UCD Dublin

International Hellenic University

innoVADE Leadership in Innovation

Enhancing Digital Skills Across Europe ALL DIGITAL

Thank you!

Digital4All

Stay in touch

Link

Link

Link

Contact us

Add your QR code here

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them. Project number: 2023-1-FI01-KA220-HED-000152599.

Co-funded by the European Union

References

Russell, S., & Norvig, P. (2021). *Artificial Intelligence: A Modern Approach (4th Edition).* Pearson.

Goodfellow, I., Bengio, Y., & Courville, A. (2016*). Deep Learning*. MIT Press.

Nilsson, N. J. (2010). *The Quest for Artificial Intelligence: A History of Ideas and Achievements*. Cambridge University Press.

LeCun, Y., Bengio, Y., & Hinton, G. (2015*). "Deep Learning."* Nature, 521(7553), 436-444.

UNESCO. (2021). *AI and Education: Guidance for Policy-Makers*.

World Economic Forum. (2020). *The Future of Jobs Report: AI in Education*.

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial Intelligence in Education: Promises and Implications for Teaching and Learning*.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence Unleashed: An Argument for AI in Education*.

Microsoft. (2023). *AI for Accessibility*. Microsoft AI for Accessibility.

UNESCO. (2022). *Harnessing AI to Advance Education*. UNESCO AI in Education.

Selwyn, N. (2020). *Education and Technology: Key Issues and Debates*.

Cope, B., & Kalantzis, M. (2019). *Artificial Intelligence in Education: A Critical Perspective*.

Binns, R. (2018). *Fairness in Machine Learning: Lessons from Political Philosophy*. Proceedings of the 2018 Conference on Fairness, Accountability, and Transparency.

O'Neil, C. (2016). *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy*.

Floridi, L. et al. (2018). *AI4People—An Ethical Framework for a Good AI Society*. Minds and Machines.

IEEE. (2021). *Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent Systems*.

OECD. (2019). *Principles on Artificial Intelligence*.

High-Level Expert Group on AI. (2019). *Ethics Guidelines for Trustworthy AI*. European Commission.

Co-funded by
the European Union