Ensuring AI as a Common Good for Education and for Humanity

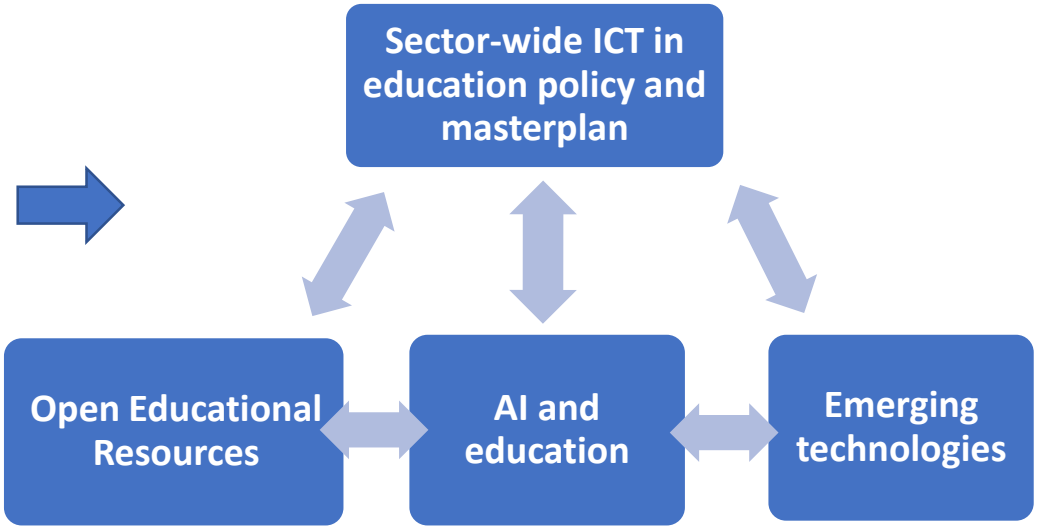
Fengchun Miao
Chief, Unit for Technology and AI in Education
UNESCO

Outline

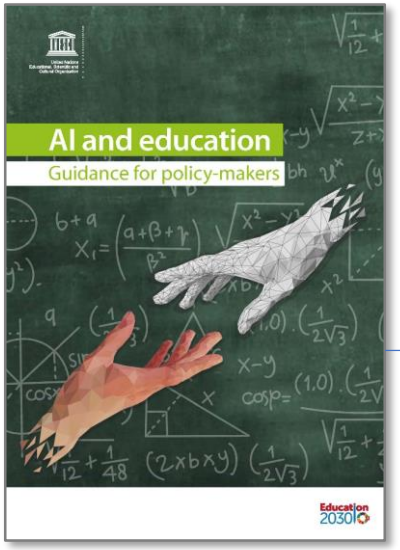
- UNESCO Work on AI and Education
- AI and the Futures of Learning

“UNESCO Portfolio” to support ICT in education policies and programmes

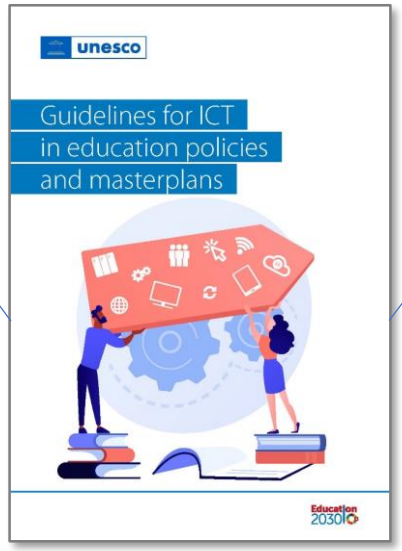
1. International standard-setting instruments
2. Intellectual guidelines or guidance
3. International conferences (e.g., 9 years of MLW)
4. Country support (60+ countries’ national ICT in education policies)



An integrated approach to National policies on AI and education



AI and Education: Guidance for Policy-makers

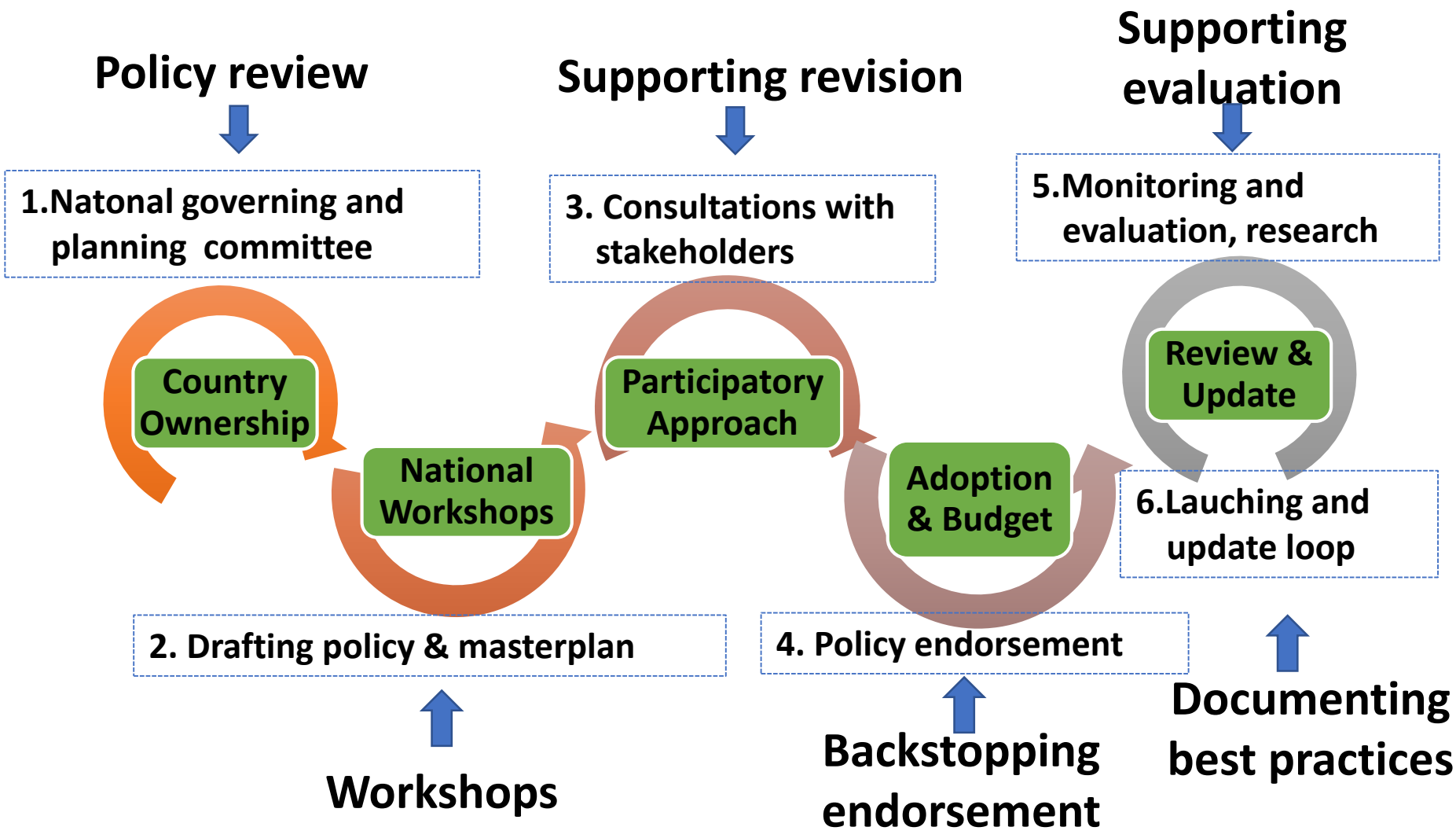


Guidelines for ICT in Education Policies and Masterplans

Guidelines on the Development of OER Policies

Support sector-wide ICT in education policies & masterplans

ICT in Education Policy Toolkit : https://en.unesco.org/icted



OER as a cross-cutting policy area

1. **Intellectual guidelines**:

- **Guidelines on the Development of OER Policies (EN, FR, SP)**
- **15 case studies**: ***OER: Policy, costs, and transformation***

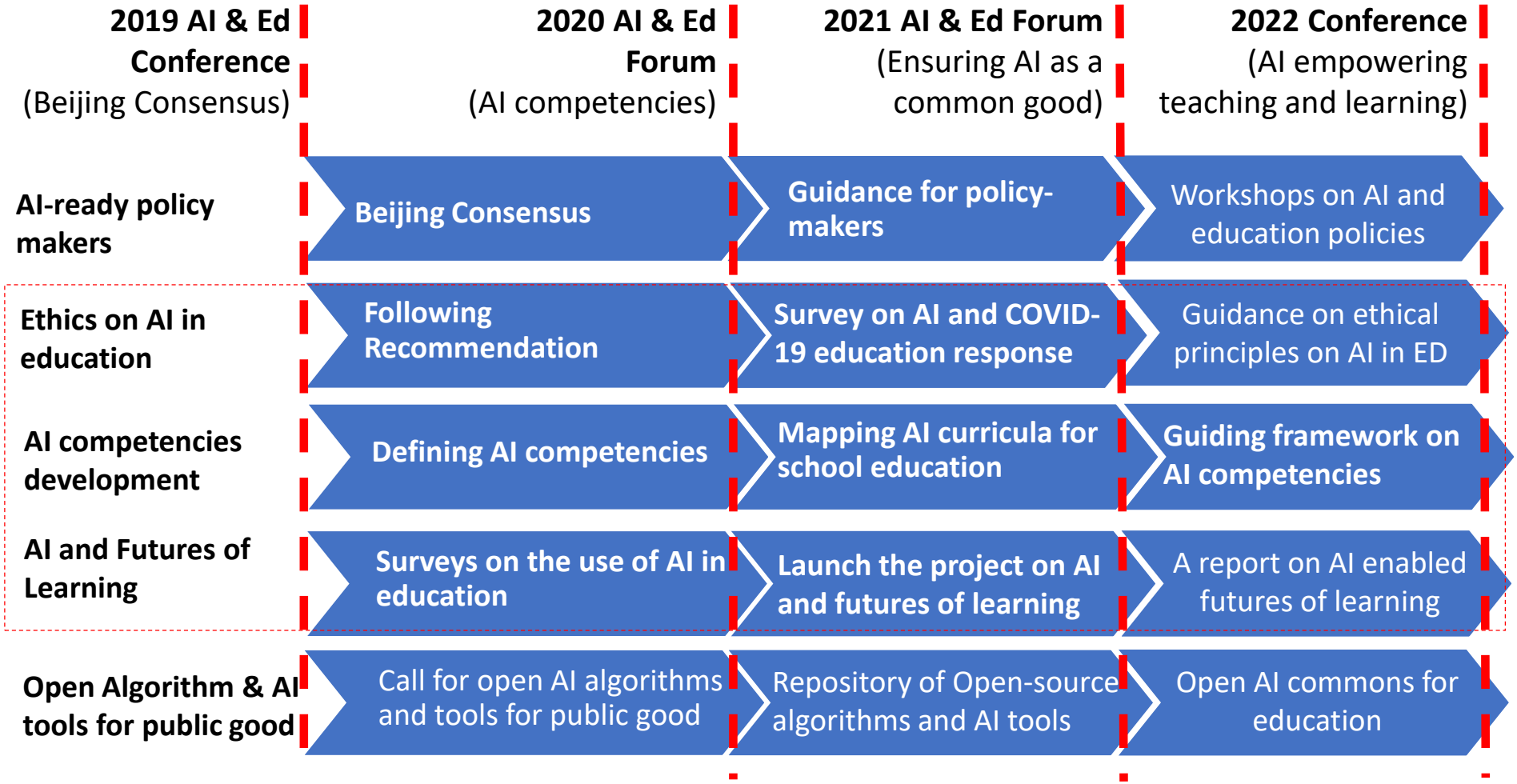
2. Instruments:

- **OER Recommendations** (2019)

3. Capacity development:

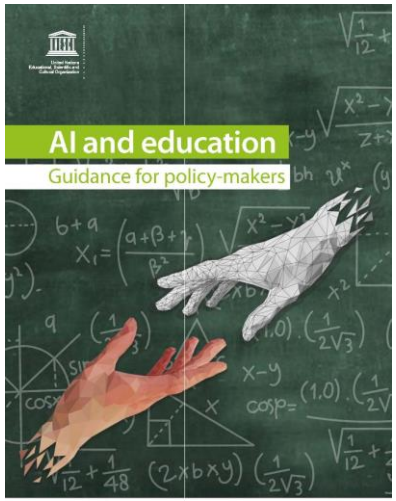
- Supported **20+ countries** in developing national *OER policies*

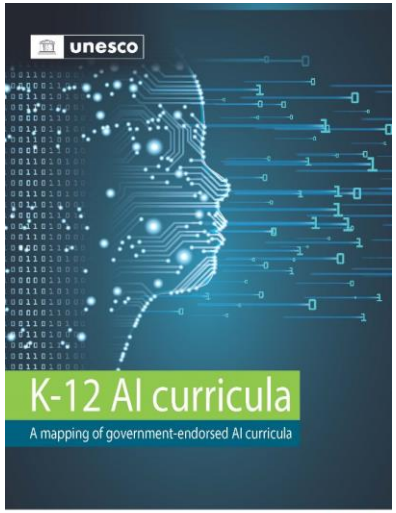
UNESCO work on AI and Education



AI and Education as a cross-cutting policy area

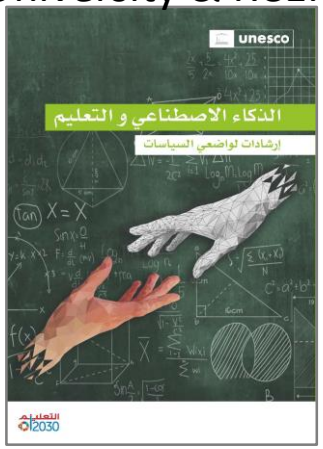
- Beijing consensus on AI and Education **(6 UN languages)**
- AI and education: Guidance for policy-makers **(6 languages)**
- K-12 AI curricula: A mapping of government-endorsed AI curricula **(2022)**
- Developing Competencies for the AI Era (2021)
- **>80 Best practices on AI in education:** Compendium (2020); Compendium (2019)



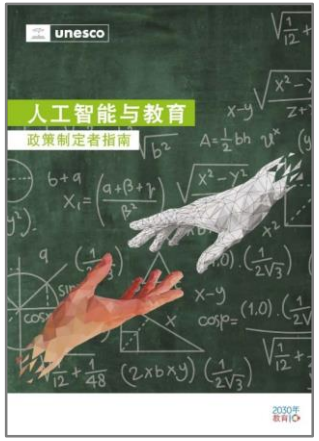


Available in six languages (Russian version coming soon)

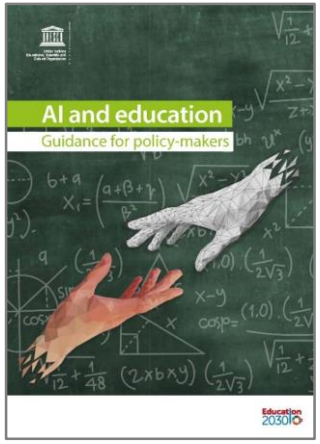
Arabic
Staffordshire University & RCEP



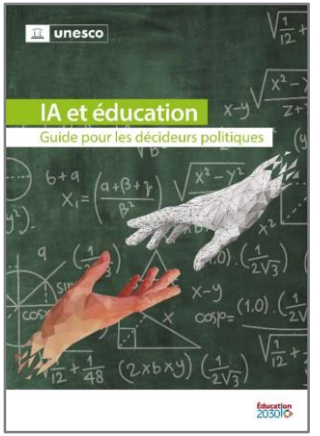
Chinese
Beijing Normal University



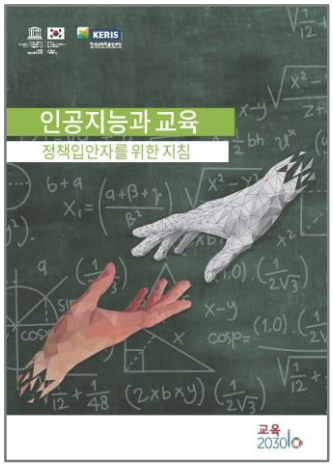
English
(Original)



French
IFEF (OIF)



Korean
KNOU, KERIS, and Korean National Commission for UNESCO



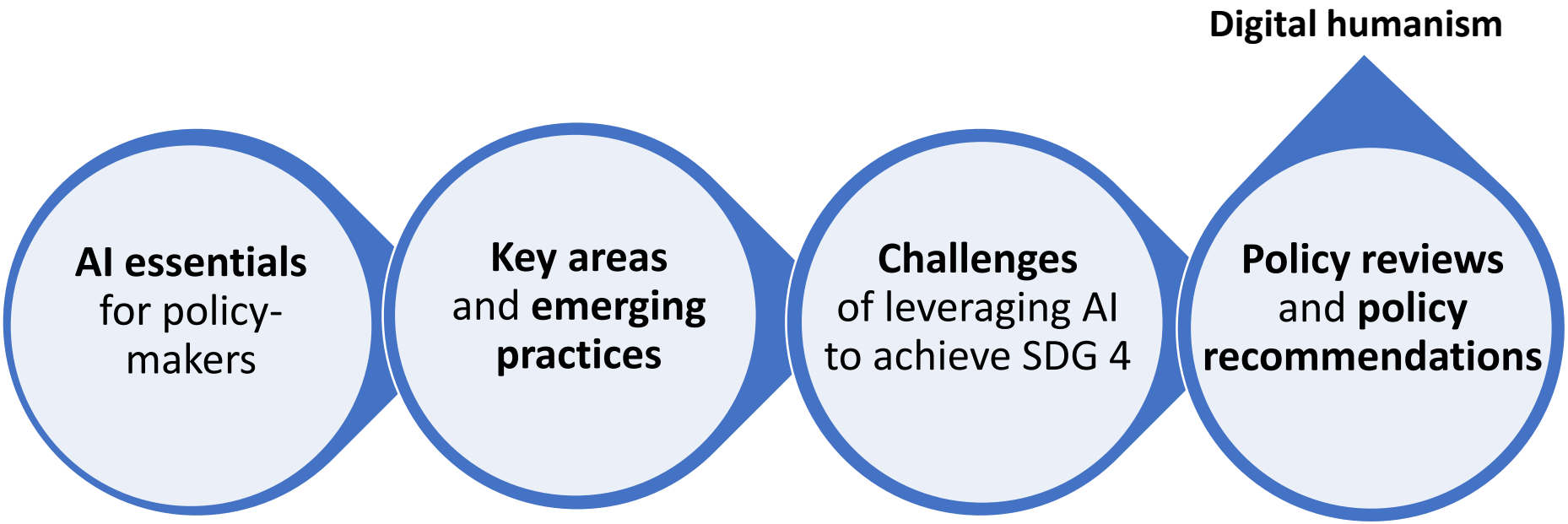
Spanish
CETIC of Brazil

Russian
Skoltech of Russia

https://unesdoc.unesco.org/ark:/48223/pf0000376709
https://www.unesco.or.kr/assets/data/report/UQ2Cd7pByyvIsMqVIsjyoVtPou9Z3i_1638430937_2.pdf

AI and Education: Guidance for policy-makers

The structure



- AI techniques
- AI technologies
- Promises and limitations

- ED provision and Management
- Teaching and teachers
- Learning
- AI competencies

- Ethics
- Digital/AI divide
- Equity & gender equality
- Human agency

AI and Education: Guidance for policy-makers

Key policy questions

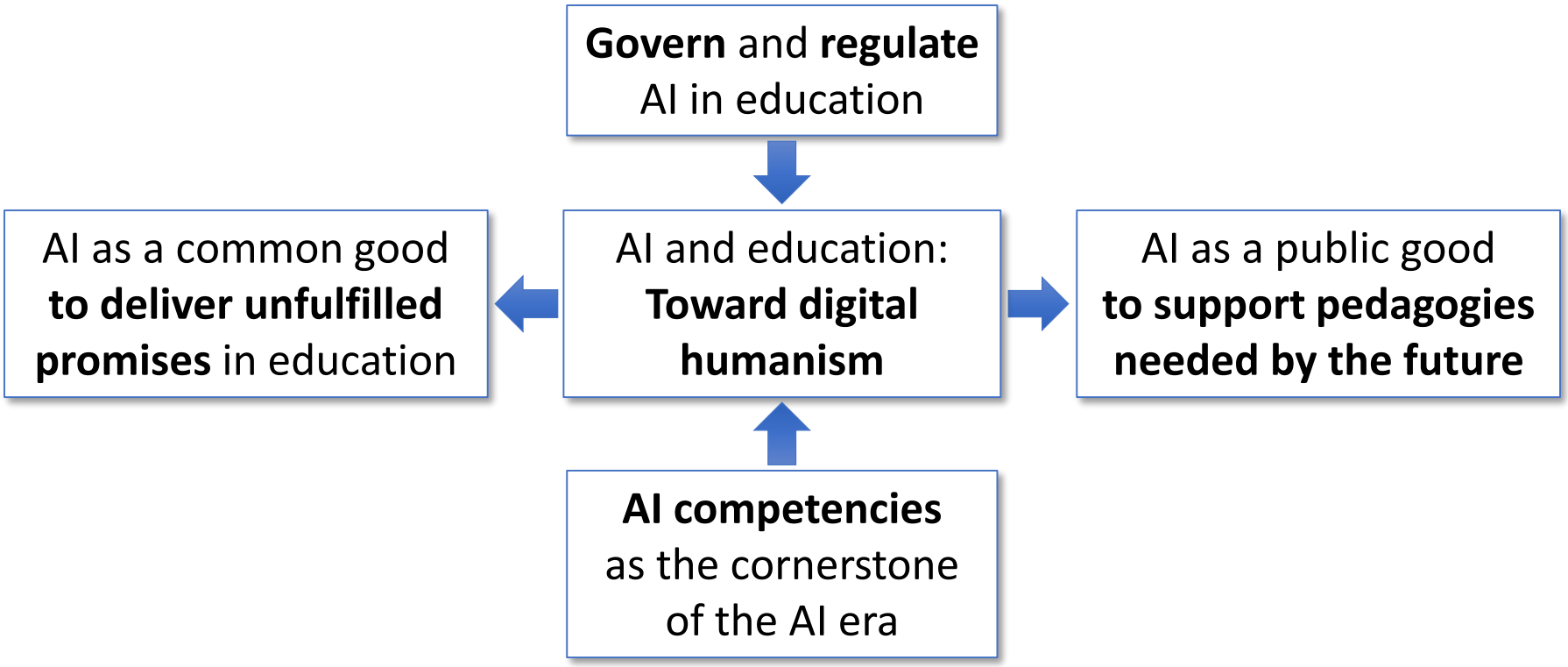
1. How to ensure **ethical and equitable** use of AI in education?

2. How can AI be used to deliver **unfulfilled promises?**

3. How can AI enable **the learning and digital humanism we want?**

4. What are **AI literacy/AI skills needed for human-AI collaboration?**

AI and Education: Policy structure



1. Regulating the use of AI in education

- **From data worship to data justice:**
- Protect data privacy : data ownership and sovereignty
- Prevent algorithm discrimination: gender bias, psychometric prediction …
- Regulate intrusive AI-powered tools
- Promote human agency: Human-machine collaboration
- **Reveal uncharted ethical issues**

Recommendation on Ethics of AI

Humanity dimension: Individuals, societies, environment and ecosystems	AI technology dimension: Data and algorithm based AI system life cycle				Historic development dimension
	Production and storage of data	Access to and control of data	Data and algorithm based decision-making	Human-AI interfaces and AI devices	Impact of existing and emerging AI on humanity
	Misinformation, disinformation, automated news	AI infrastructure divide, digital skills gaps, void of data privacy protection laws	Bias in data labelling; Ceding to machine decision-making	Implantable AI; Agressive AI; AI surveillance	Human-AI coloration for growth & values development of future generations
Individuals	• Data privacy; • Data security;	• Control over personal data • Individuals' digital divide	• Information Cocoons • Enfeeble human agency	• Physical stimulation and intervention	• Redefining human agency and humanity under human-AI collaboration
Societies	• Amplified disinformation, misinformation, hate speeches	• Gender and other inequality in accessing AI; • AI wealth concentration	• Algorithmic Bias; • Values Cocoons • Threatening linguistic and cultural diversity and pluralism	• Digital colonization	• New forms of "living together" in real-virtual hybrid spaces
Sovereign states	• Legal framework on human rights and fundamental freedoms • National data security	• Divide in infrastructure, algorithms, and computing capacities needed by data mining • Data sovereignty;	• Automation-spurred job loss; • AI in policing; • AI in public service, democracy, mass media etc.	• Objectifying humans	• Data as a new form of personal property recognized and protected by sovereign states
Environments and ecosystems	• Carbon emission of digitalization	• Ignorance of animal welfare & protection of environments and ecosystems	• Machine decisions do harm to environments and ecosystems	• e-Wastes	• Can AI enable the turning point of global warming?

2. AI as a common good to deliver unfulfilled promises

- Address language barriers
- Enable learners with disabilities (e.g. vision or hearing)
- Diagnose learning disabilities (e.g. dyslexia and other reading difficulties, autism spectrum, …)
- Monitoring learning problems and failures
- More fundamental challenges

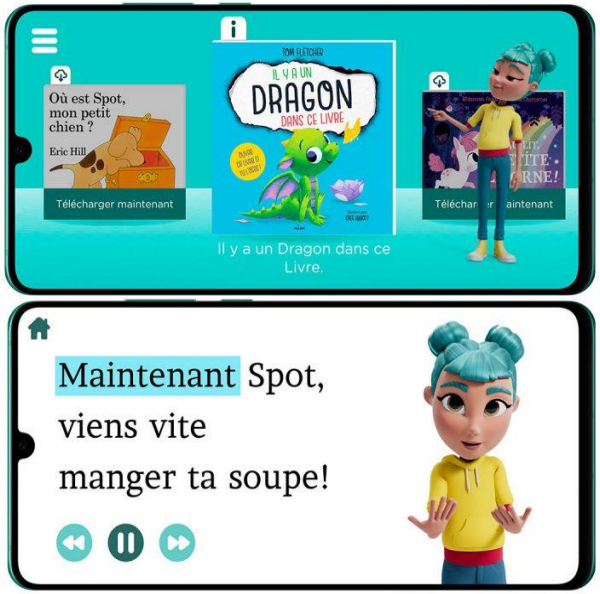
Making AI a common good for the futures of learning

1. Inclusive access

- **Huawei StorySign**

2. To diagnose and treat Autism

- Naturalistic Observation Diagnostic Assessment -
- AIDA help autistic children and closest people to communicate effectively



3. To support learners with dyslexia or reading difficulties

- **Change Dyslexia (Laureate of the 2019 edition of UNESCO Prize for ICT in Education)**

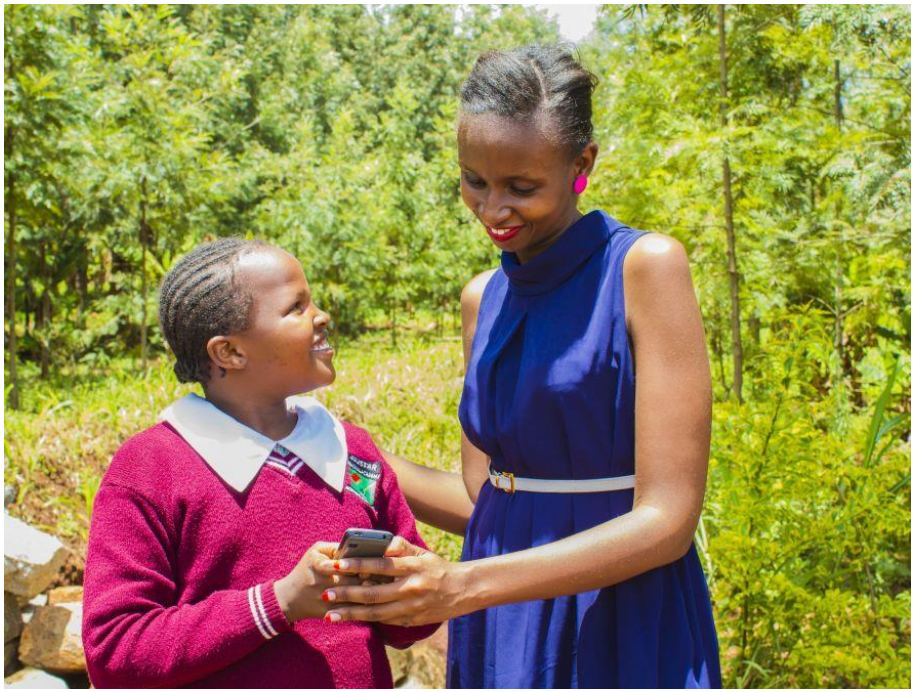
4. To treat writing difficulties

- Lexplore - AI Reading Analytics: An AI based assessment to determine reading attainment and diagnose children's reading difficulties like Dyselxia within minutes.

Making AI a common good for the futures of learning

5. Content profiling

- **M-Shule – “mobile school" in Swahili of Kenya:** first personalized knowledge-building platform in Africa to connect learners to tailored learning, evaluation, activation, and data tools over SMS. https://m-shule.com/



Making AI a common good for the futures of learning

6. Low-skill education management task units

Natural language processing and machine learning based Educational Chatbots:

- "One College Student per Village" (Laureate of the 2020 edition of UNESCO Prize for ICT in Education) of the Open University of China uses Chatbots to help villagers.

Making AI a common good for the futures of learning

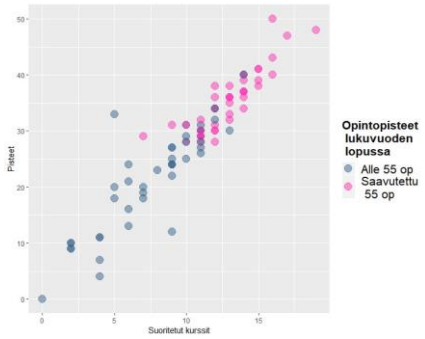
7. Data-informed psychometric profiling

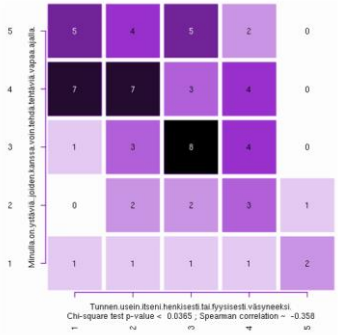
Adaptive Learning Platform (ALP) - analyses users; data, aggregating it to create psychometric profiles of each individual student's interactions, preferences, and achievements - it should not be used to pre-determine student's futures: https://www.kidaptive.com/

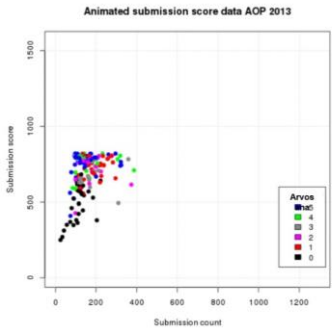
Making AI a common good for the futures of learning

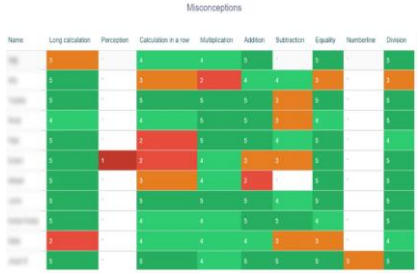
8. Monitoring learning outcomes and drop-out

- ViLLE - an adaptive digital learning platform developed by University of Turku, Finland (Laureate of the 2020 edition of UNESCO Prize for ICT in Education): https://www.learninganalytics.fi/en/ville









ACHIEVING CURRICULUM OBJECTIVES

ANALYSIS OF STUDY HABITS

PREDICTING COURSE GRADES

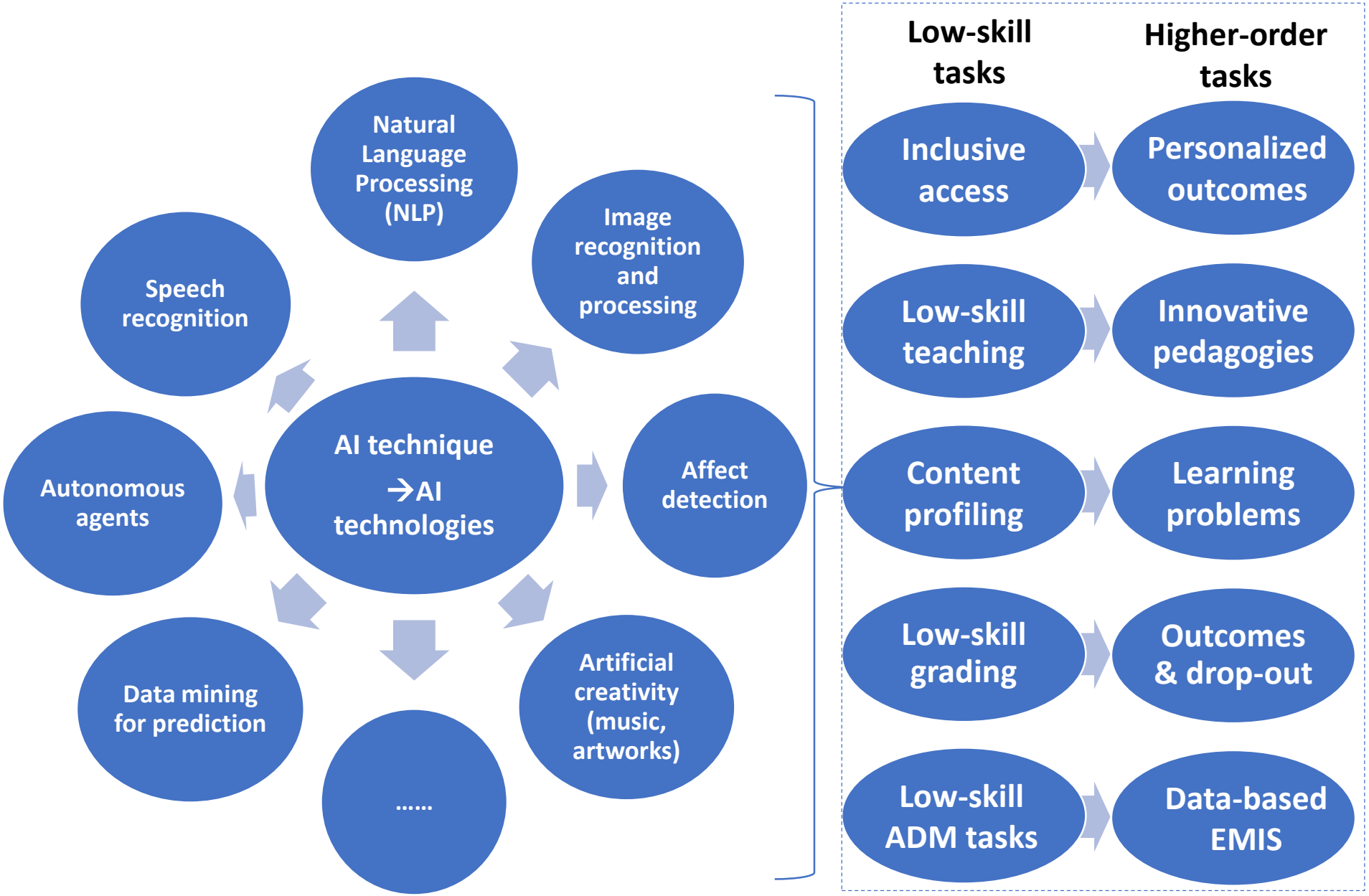
AUTOMATING LEARNING ANALYTICS

ETHICS AND PRIVACY IN LEARNING ANALYTICS

3. AI to enable the futures of learning

- Current AI algorithms focus on factual knowledge transmission, or other low-skill tasks.
- The benefits of AI in education won't happen until AI augments humanity: empowers teachers and enhances student agency.
- Be mindful of possible **AI-enabled disruptive transformation**.

What sort of AI, to enable what sort of learning?



4. Developing AI competencies

- **Humanistic values toward AI**
- **AI literacy for individuals**: What are the values, knowledge, and skills needed by all to live and work effectively with AI?
- **AI skills for countries**: What human capital is needed by countries for them to leverage the possibilities of Industry 4.0?

K-12 AI curricula: A mapping of government-endorsed AI curricula

→A survey to 193 Member States → interviews

→A survey to non-governmental AI curriculum developers

→ Literature reviews

A Guiding Framework on AI Curriculum Development

Key findings

- **Government-endorsed K-12 AI curricula**

- **Analysis of government-endorsed curricula**

Data

- Curriculum development and endorsement mechanisms
- Curriculum integration and management
- Curriculum content and time allocation
- Learning outcomes
- Curriculum implementation

Country examples

- Qatar
- India
- Australia
- Korea
- China

- **Recommendations**

Government-endorsed K-12 AI curricula

- Only 10 countries have developed and endorsed K-12 AI curricula

Country/ region	Curriculum title	Grades		
		Primary	Middle	High
Armenia	1. Curriculum of ICT		X	X
Austria	1. Data Science and Artificial Intelligence			X
Belgium	1. IT Repository			X
China	1. AI curriculum embedded in the Information Science and Technology curriculum	X	X	X
India	1. Atal Tinker Labs AI modules		X	X
Republic of Korea	1. 'AI Mathematics' under Mathematics Subject Group for High schools			X
	1. 'AI Basics' under Technology Home Economics Subject Group for high schools			X
Kuwait	1. Standards curriculum	X	X	
Portugal	1. Information and Communication Technologies	X	X	X
Qatar	1. Computing & Information Technology	X	X	X
	1. Computing & Information Technology (High Tech Track)			X
Serbia	1. Informatics and programming – Grade 8		X	
	1. Modern technologies – Grade 3 and 4 of gymnasium			X
UAE	1. AI curriculum embedded under the Technology Subject Framework	X	X	X

Government-endorsed K-12 AI curricula

- 4 countries have K-12 AI curricula in development
- **None of these countries are from Africa**

Country/ region	Curriculum title	Grades		
		Primary	Middle	High
Germany	1. Identifying and Formulating Algorithms [Algorithmen erkennen und formulieren]	X	X	X
Jordan	2. Digital Skills		X	X
Bulgaria	3. Computer Modelling, Information Technology and Informatics	X	X	X
Saudi Arabia	4. Digital Skills	X	X	X

Defining AI literacy and AI curriculum structure

→UNESCO Report on Developing AI Competencies (2021)

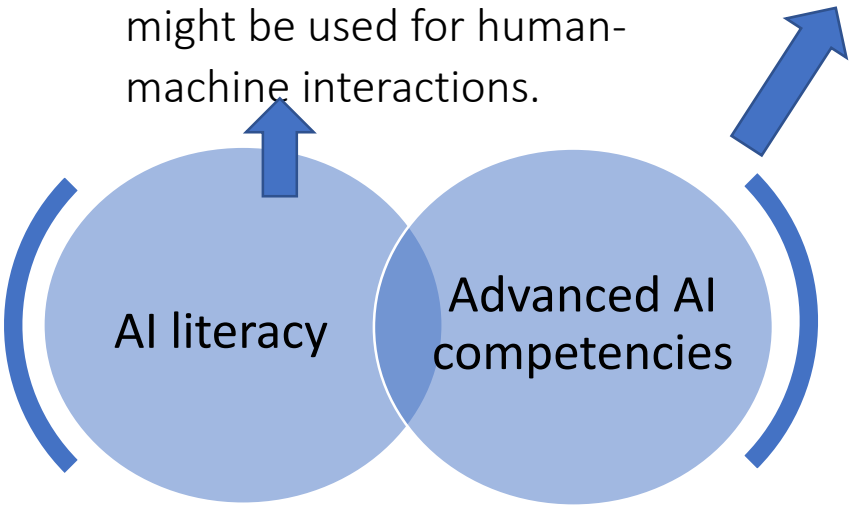
→ K-12 AI curricula: A mapping of government-endorsed AI curricula **(2022)**

- Understanding what the impact of AI might be, what AI can do and what it cannot do, when AI is useful and when its use should be questioned, and how AI might be steered for the public good.

- **Data literacy:** understanding how AI collects, cleans, manipulates, and analyses data
- **Algorithm literacy:** understanding how the AI algorithms find patterns and connections in the data, which might be used for human-machine interactions.

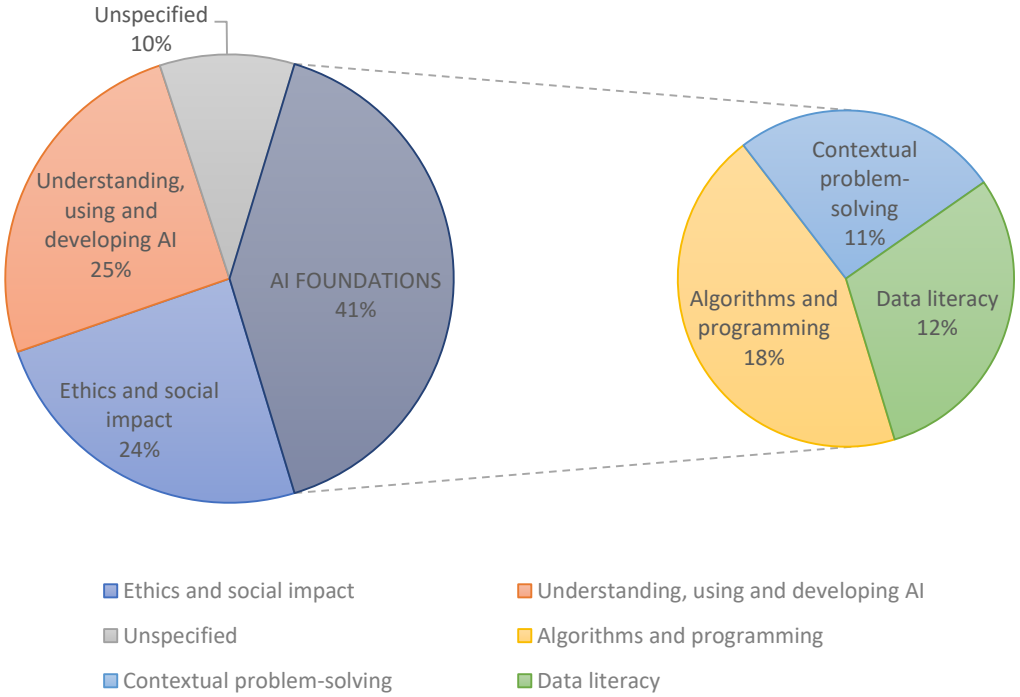
- Algorithms and programming
- Data literacy
- Contextual problem-solving
- Ethics and social issues
- AI techniques and technologies

- Value orientation
- Knowledge
- Skills



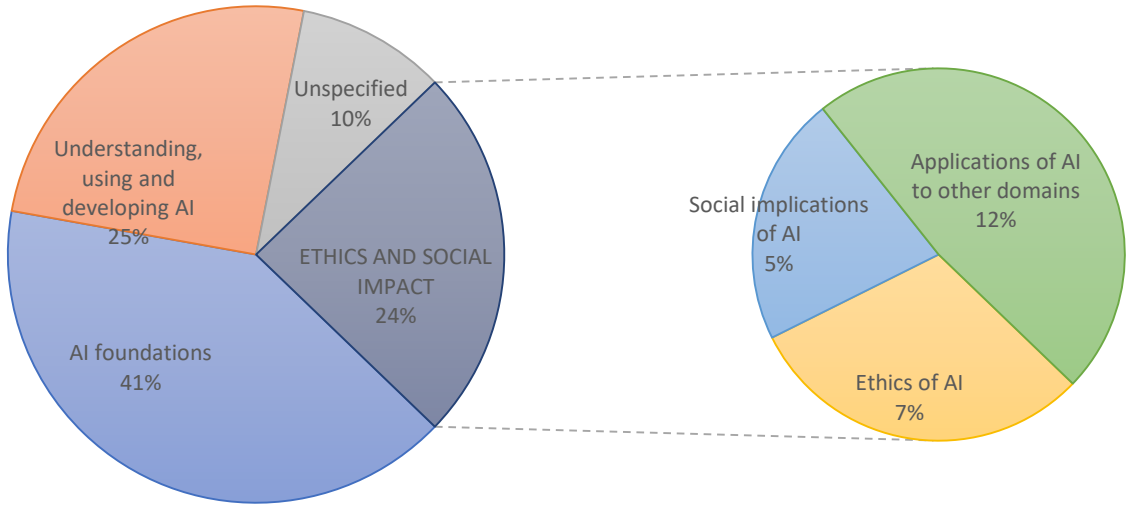
Time allocation for areas under *AI foundations*

- AI foundations: algorithms and programming, data literacy and contextual problem-solving



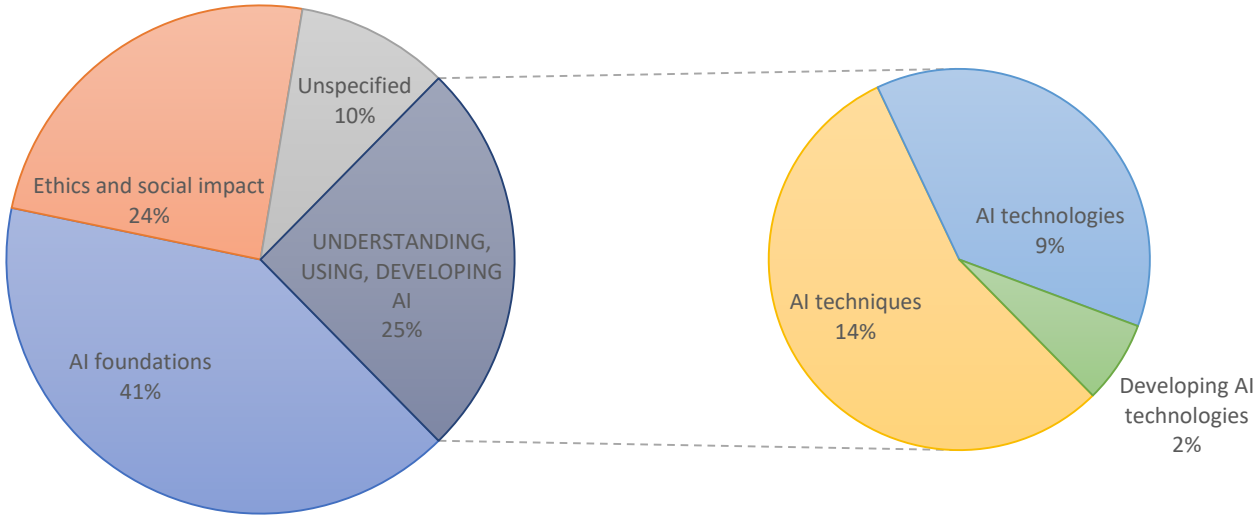
Time allocation for *ethics and social impact*

- ***Ethics and social impact***: ethics of AI, social impact of AI, application of AI to other domains



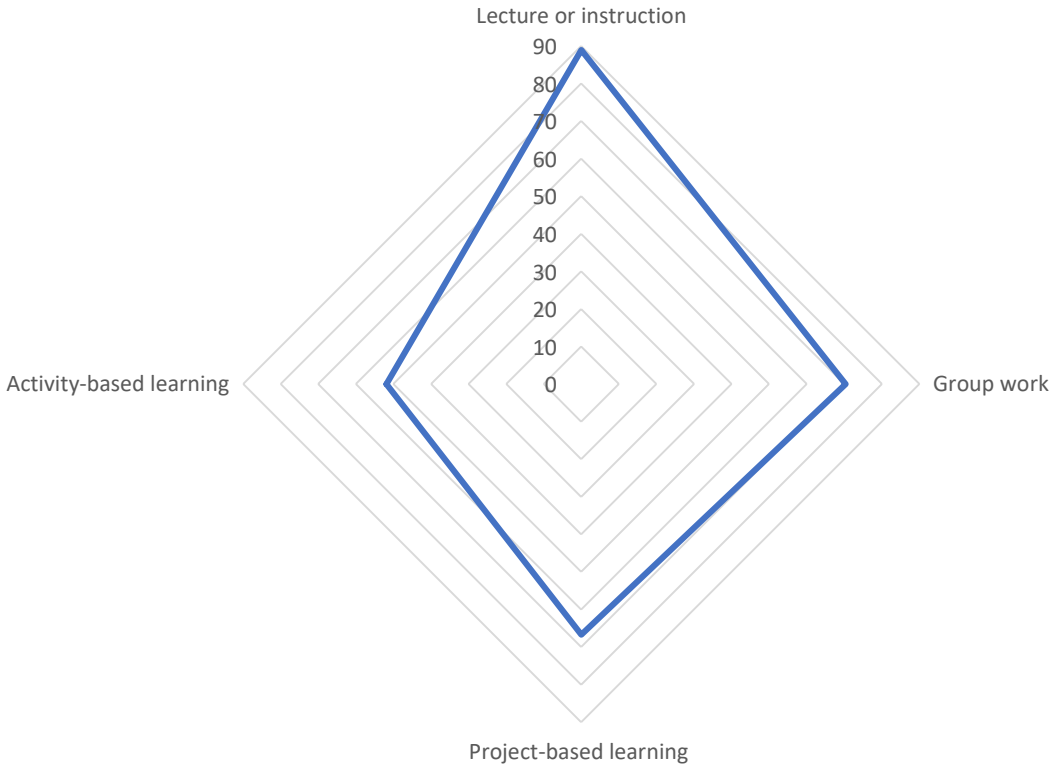
Time allocation for *understanding, using and developing AI*

- ***Understanding, using and developing AI***: AI techniques, AI technologies, developing AI technologies



Curriculum implementation

Suggested pedagogies



Curriculum implementation

Teacher training and support

- **Upskilling existing teaching staff**
- **Integrating AI into initial teacher preparation**
- **Supporting in-service teachers**

Preparing teachers to work in AI-rich education settings

AI literacy
(Data & Algorithm Literacy)

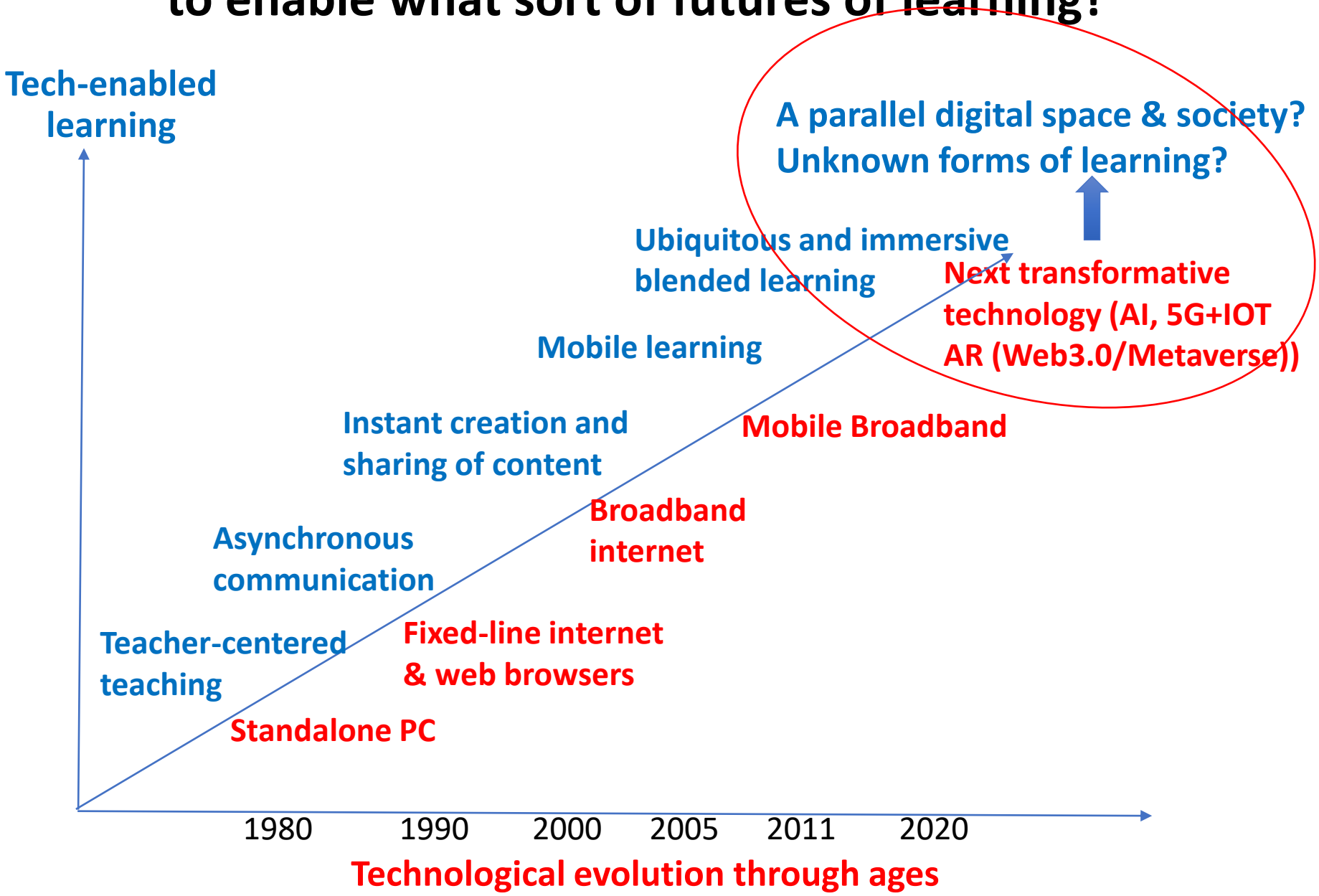
Knowledge & skills on domain-specific AI adopted in local settings

Data-informed decision-making skills on teaching methodologies

Key findings and recommendations

- **A sense of urgency** in developing K-12 AI curricula
- **Stronger governmental validation** to balance the private-driven approach
- **Evidence base** on the quality and effectiveness of AI curriculum
- **Resource development and teacher training** are key to curriculum integration
- Learning outcomes may focus more on **creativity and contextual ethics**
- **Project-based learning** is commonly used pedagogical methodology
- **‘Agnostic approach’** to AI brands and AI technologies

What sort of future technologies to enable what sort of futures of learning?



Thank you

f.miao@unesco.org

https://en.unesco.org/covid19/educationresponse

https://en.unesco.org/themes/ict-education

https://en.unesco.org/themes/ict-education/toss

https://on.unesco.org/AIEDforum2021