Potentials, Challenges and selected examples for addressing the implementation of AI into TVET

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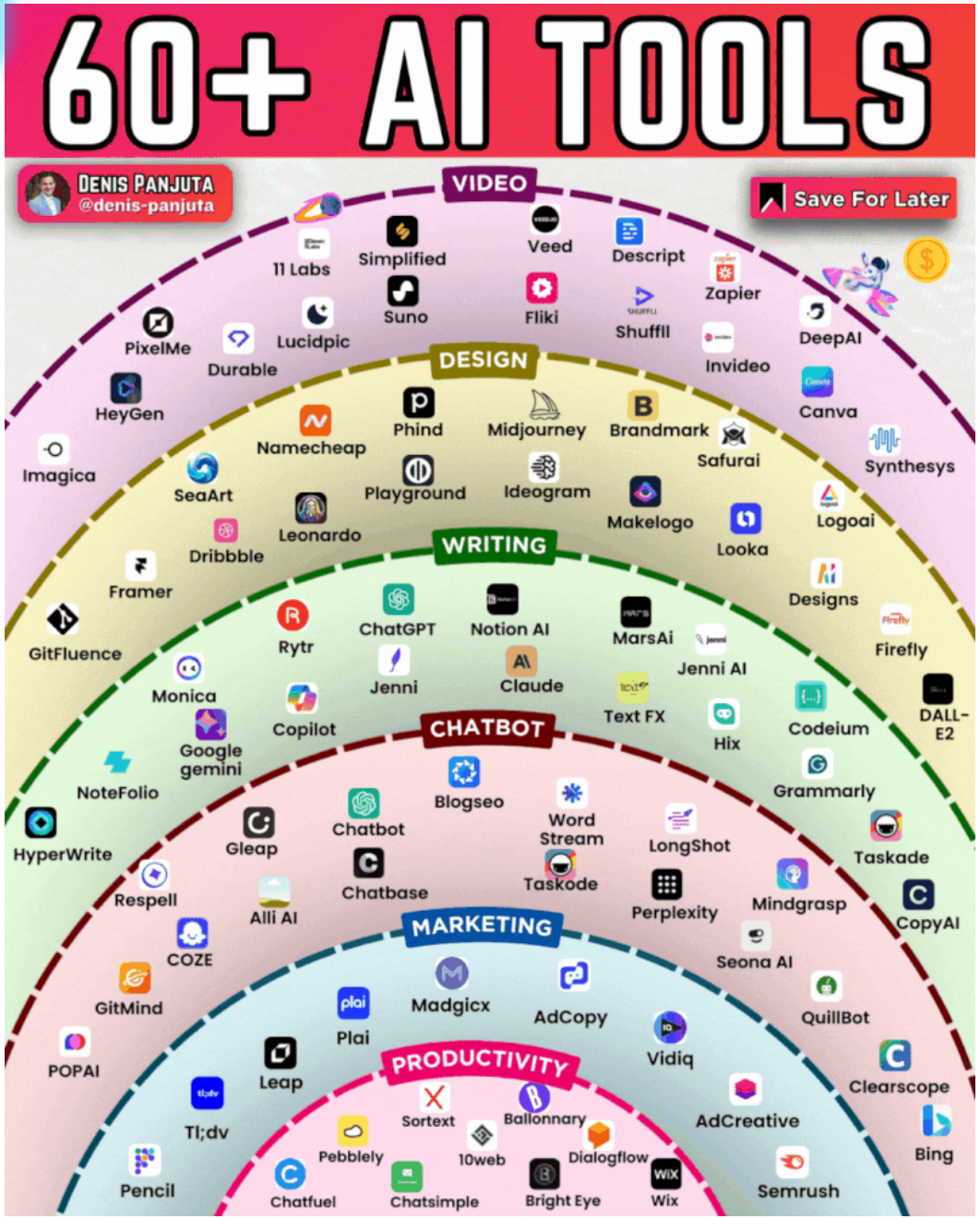
1. Introduction: Current Situation

- Dynamically growing number and variety of AI-related instruments, tools, etc.



- Approaches for a classification of AI are dominantly technology-oriented
- Specifics of an integration in education (e.g. TVET) are mainly not considered

2. Statements from international discussion on the application of AI in education

Statements from international discussion on the application of AI in education

UNESCO:
- Beijing Consensus on Artificial Intelligence and Education (2019)
- AI and Education-Guidance for policy makers (2021)
- Guidance for generative AI in education and research (2023)

World Economic Forum (WEF):
- Shaping the Future of Learning: The Role of AI in education 4.0 (2020)

Cedefop:
- Skills empower workers in the AI revolution (2025)

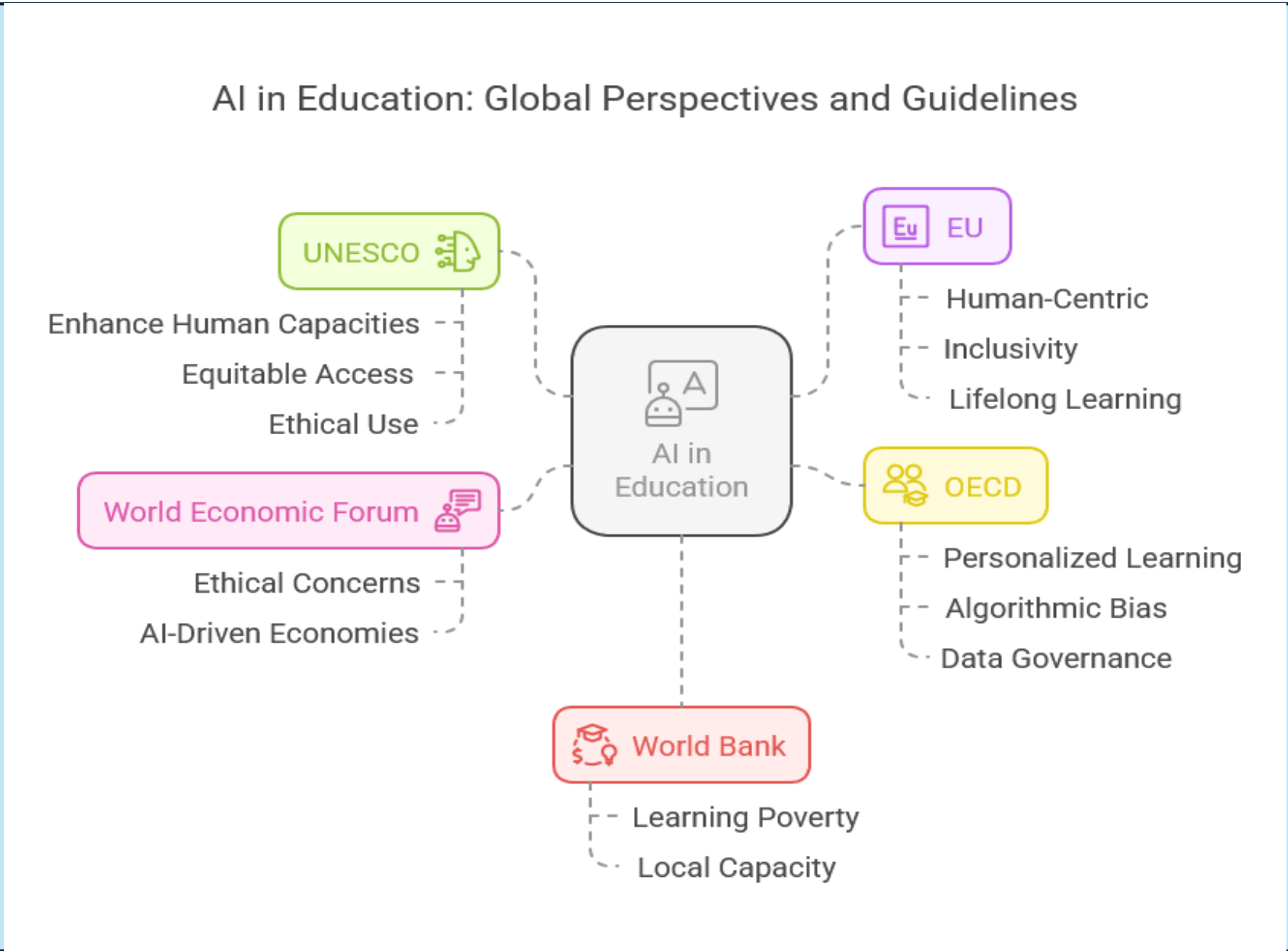
World Bank:
- EdTech Strategy (2020)

ILO:
- Mind the AI Divide: Shaping a global perspective on the future of work (2024)

OECD:
- Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development (2021)
- AI and the Future of Skills (2023)
- The potential impact of AI on Equity and Inclusion in Education (2024)

2. Overview of the current state of the general international discussion on the application of AI in education

Key statements from these positionings:



3. Existing competency frameworks to guide teachers and learners in the application of AI in learning processes

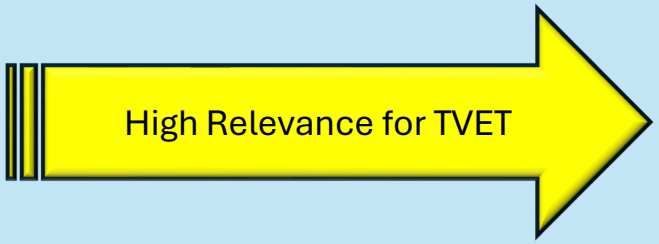
UNESCO:

- ***AI competency framework for teachers (2024)***

Defines 15 competencies across five dimensions:

- human-centered mindset,
- ethics of AI,
- AI foundations and applications,
- AI pedagogy, and
- AI for professional learning.

It categorizes these competencies into three progression levels: acquire, deepen, and create.



Aspects	Progression		
	Acquire	Deepen	Create
1. Human-centred mindset	Human agency	Human accountability	Social responsibility
2. Ethics of AI	Ethical principles	Safe and responsible use	Co-creating ethical rules
3. AI foundations and applications	Basic AI techniques and applications	Application skills	Creating with AI
4. AI pedagogy	AI-assisted teaching	AI-pedagogy integration	AI-enhanced pedagogical transformation
5. AI for professional development	AI enabling lifelong professional learning	AI to enhance organizational learning	AI to support professional transformation

3. Existing competency frameworks to guide teachers and learners in the application of AI in learning processes

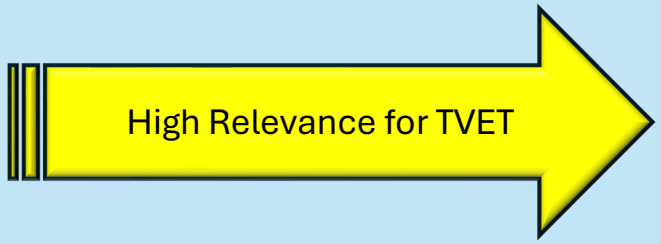
UNESCO:

- ***AI competency framework for students (2024)***

Outlines 12 competencies across four dimensions:

- human-centered mindset,
- ethics of AI,
- AI techniques and applications,
- AI system design.

It spans three progression levels: understand, apply, and create

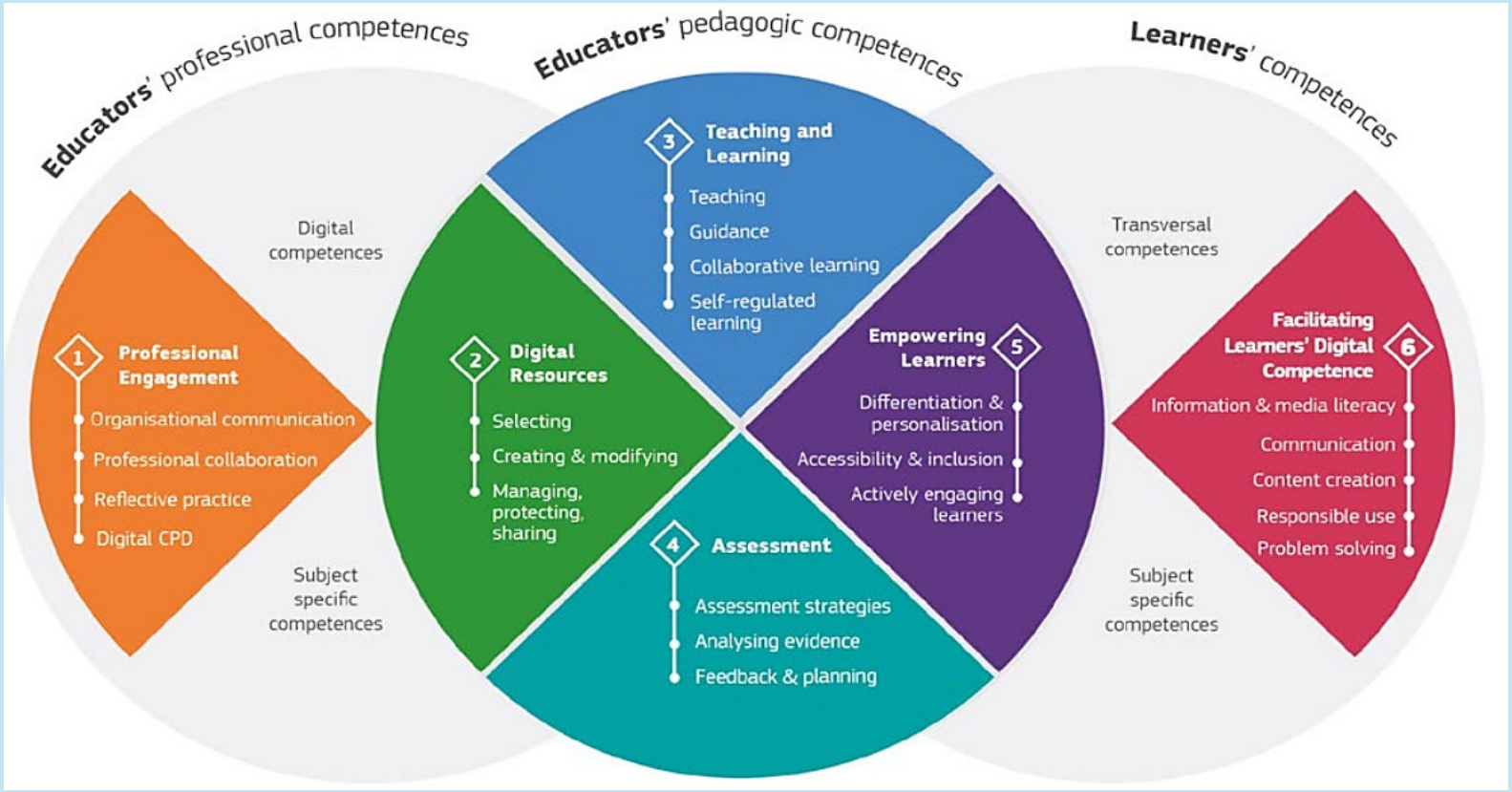


Competency aspects	Progression levels		
	Understand	Apply	Create
Human-centred mindset	Human agency	Human accountability	Citizenship in the era of AI
Ethics of AI	Embodied ethics	Safe and responsible use	Ethics by design
AI techniques and applications	AI foundations	Application skills	Creating AI tools
AI system design	Problem scoping	Architecture design	Iteration and feedback loops

3. Existing competency frameworks to guide teachers and learners in the application of AI in learning processes

EU: European Digital Competence Frameworks

- DigiCompEdu: Focuses on digital sills for educators, ranging from professional engagement to digital content creation



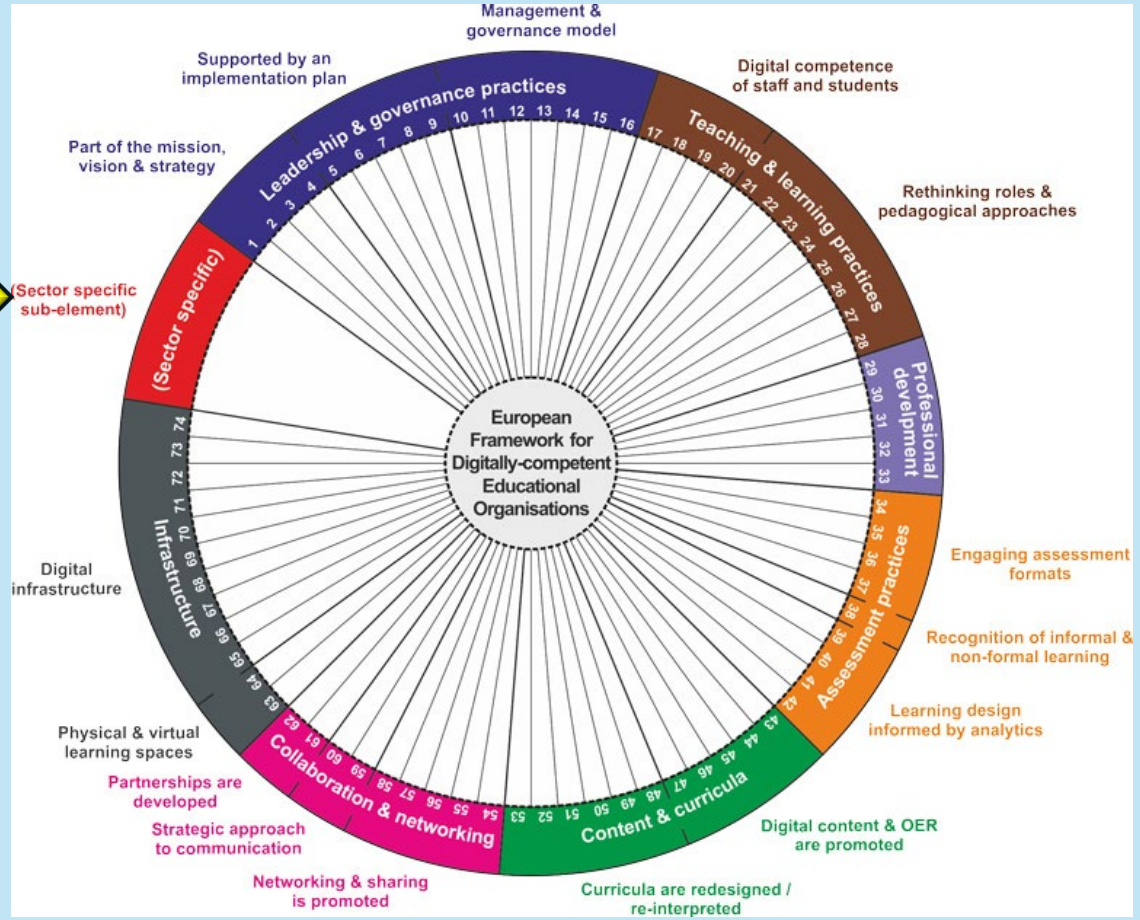
(To be adapted to phenomena of integration of AI in education)

3. Existing competency frameworks to guide teachers and learners in the application of AI in learning processes

EU: European Digital Competence Frameworks

- European Framework for digitally-competent Educational Organisations

High Relevance for TVET



(To be adapted to phenomena of integration of AI in education / TVET)

3. Existing competency frameworks to guide teachers and learners in the application of AI in learning processes

EU: European Digital Competence Frameworks

- DigComp2.2 – Digital Competence Framework for Citizens

Information and data literacy	1.1. Browsing, searching and filtering data, information and digital content 1.2. Evaluating data, information and digital content 1.3. Managing data, information and digital content
Communication and collaboration	2.1. Interacting through digital technologies 2.2. Sharing information and content through digital technologies 2.3. Engaging in citizenship through digital technologies 2.4. Collaborating through digital technologies 2.5. Netiquette 2.6. Managing digital identity
Digital content creation	3.1. Developing digital content 3.2. Integrating and re-elaborating digital content 3.3. Copyright and licences 3.4. Programming
Safety	4.1. Protecting devices 4.2. Protecting personal data and privacy 4.3. Protecting health and well-being 4.4. Protecting the environment
Problem solving	5.1. Solving technical problems 5.2. Identifying needs and technological responses 5.3. Creatively using digital technologies 5.4. Identifying digital competence gaps

(To be adapted to phenomena of integration of AI in education / TVET)

4. Selected examples on current developments in German Vocational Education and Training on the use of AI in initial and further Vocational Education and Training and Career Development

Following some examples on projects related to the integration of AI in TVET in Germany:

Sperle: AI-supported tools for personalized learning in vocational education

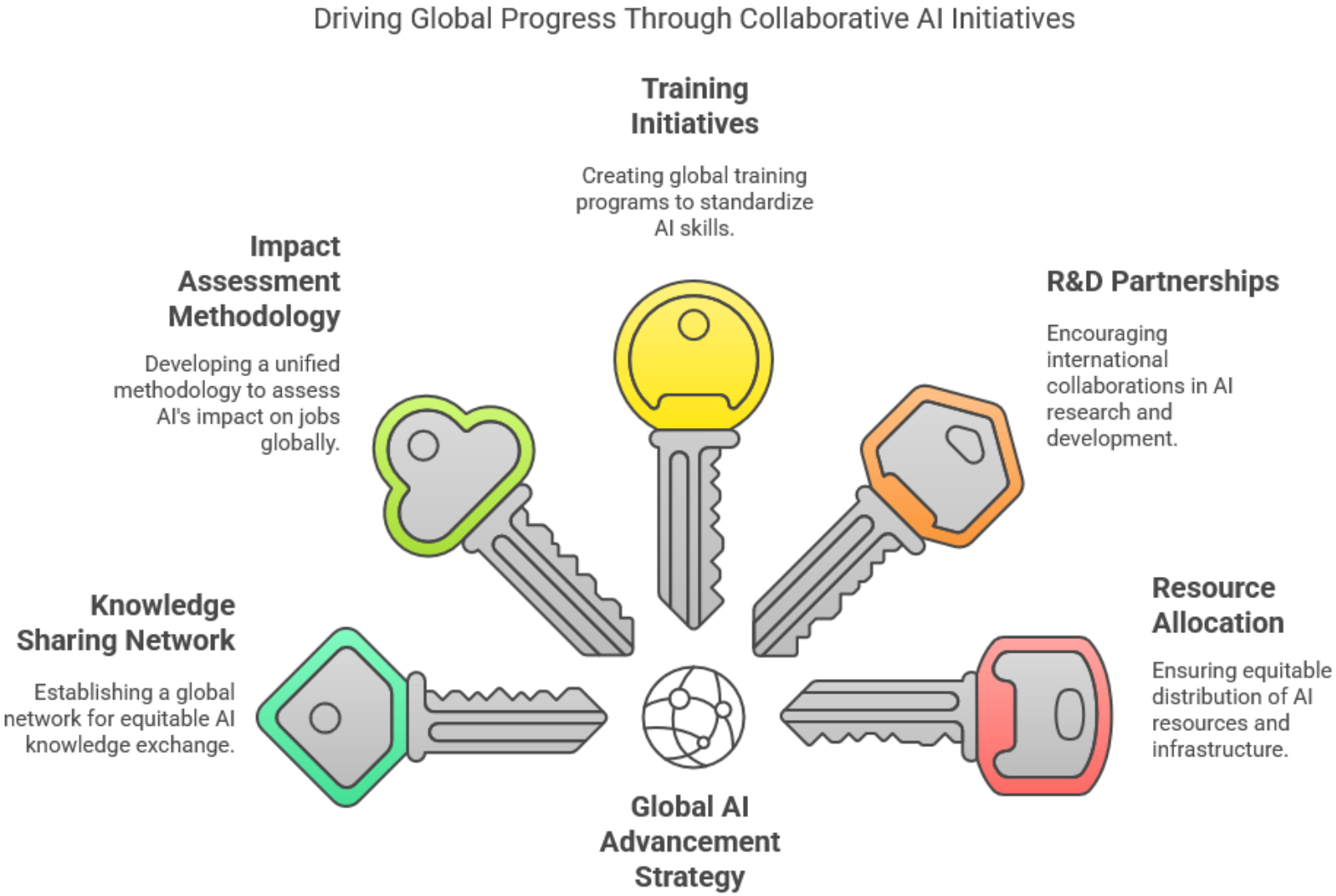
AZUBOT: Learning with Performance Assessment and AI Assistance

KI B^{3}:

- Additional qualification "Artificial Intelligence and Machine Learning"
- Certified professional specialist "Artificial Intelligence and Machine Learning"
- Bachelor Professional "Artificial Intelligence and Machine Learning"

Approaches to AI application in the area of continuing TVET currently dominate

5. Conclusions for Approaches in International Vocational Education and Training Cooperation on Integration of AI in TVET



(*Proposal by ILO*)

5. Conclusions for Approaches in International Vocational Education and Training Cooperation on Integration of AI in TVET

Recommendation:

Approaches should be based on a classification of AI use in target dimensions of the TVET ecosystem

Learners	Teachers	Educational Institutions Companies	Society
Promoting personalized and individualized learning	Reducing the workload of teachers	Improving the quality of learning opportunities	Improving equal opportunities
Enabling collaboration and networking between learners	Time savings in teaching activities	Evaluation of learning opportunities	Enabling participation
Enabling personal responsi-bility and self-regulation of learning	Support in preparing exams	Assessment of educational needs	Raising awareness of lifelong learning
Increasing learning efficiency	Improving selection or gene-ration of teaching materials	Documentation of educational processes	Promoting inclusion and accessibility
Supporting the acquisition of action sequences through simulations	Increasing the motivation of learning groups	Increasing learner satisfaction	Promoting internationalization
Internationalization of learning	Establishment of Student Information Systems	Reduce costs	
Increasing the practical relevance of learning			

Thank‘s for your attention !

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