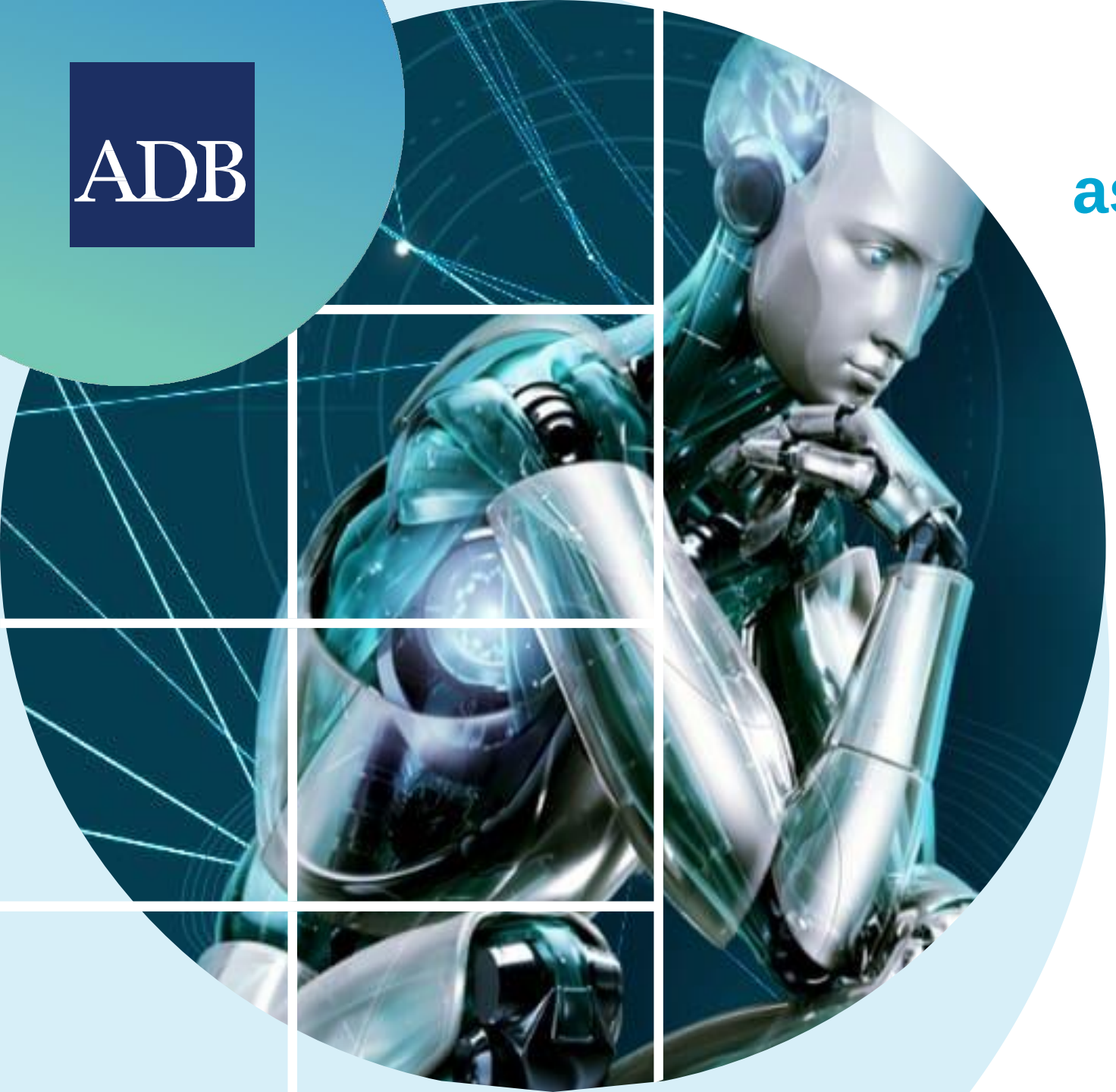

Rethinking digital assessment in the era of generative AI

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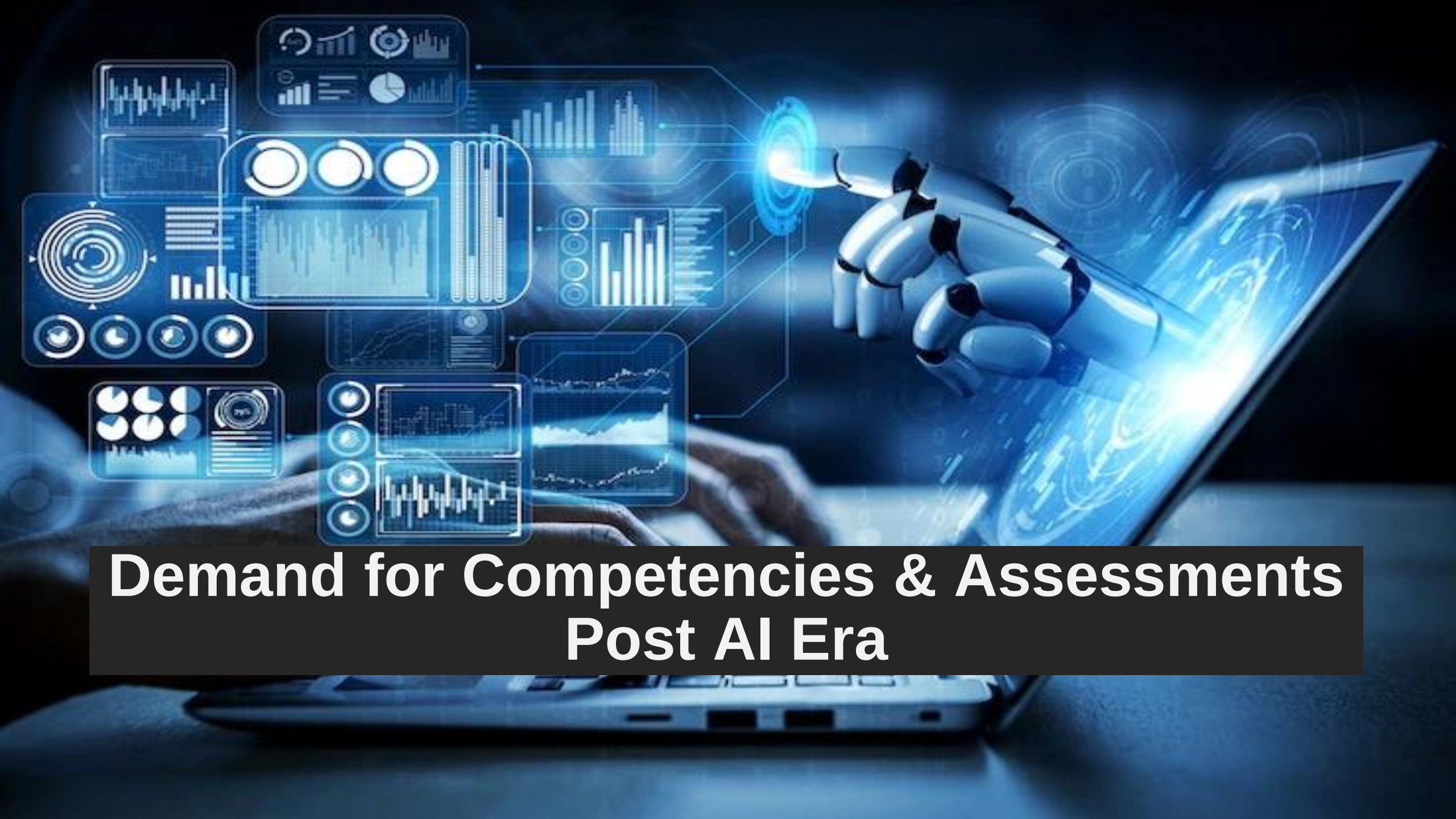
18 April 2024

Presentation Outline

- Demand for competencies and assessment post AI Era
- Assessing teachers' AI competencies
- Assessing students' AI competences
- AI driven smart classrooms for personalized learning and assessment



Demand for Competencies & Assessments Post AI Era

Employability Challenge Due to AI & Digitization

New Challenges

Widening digital divide

Old job losses

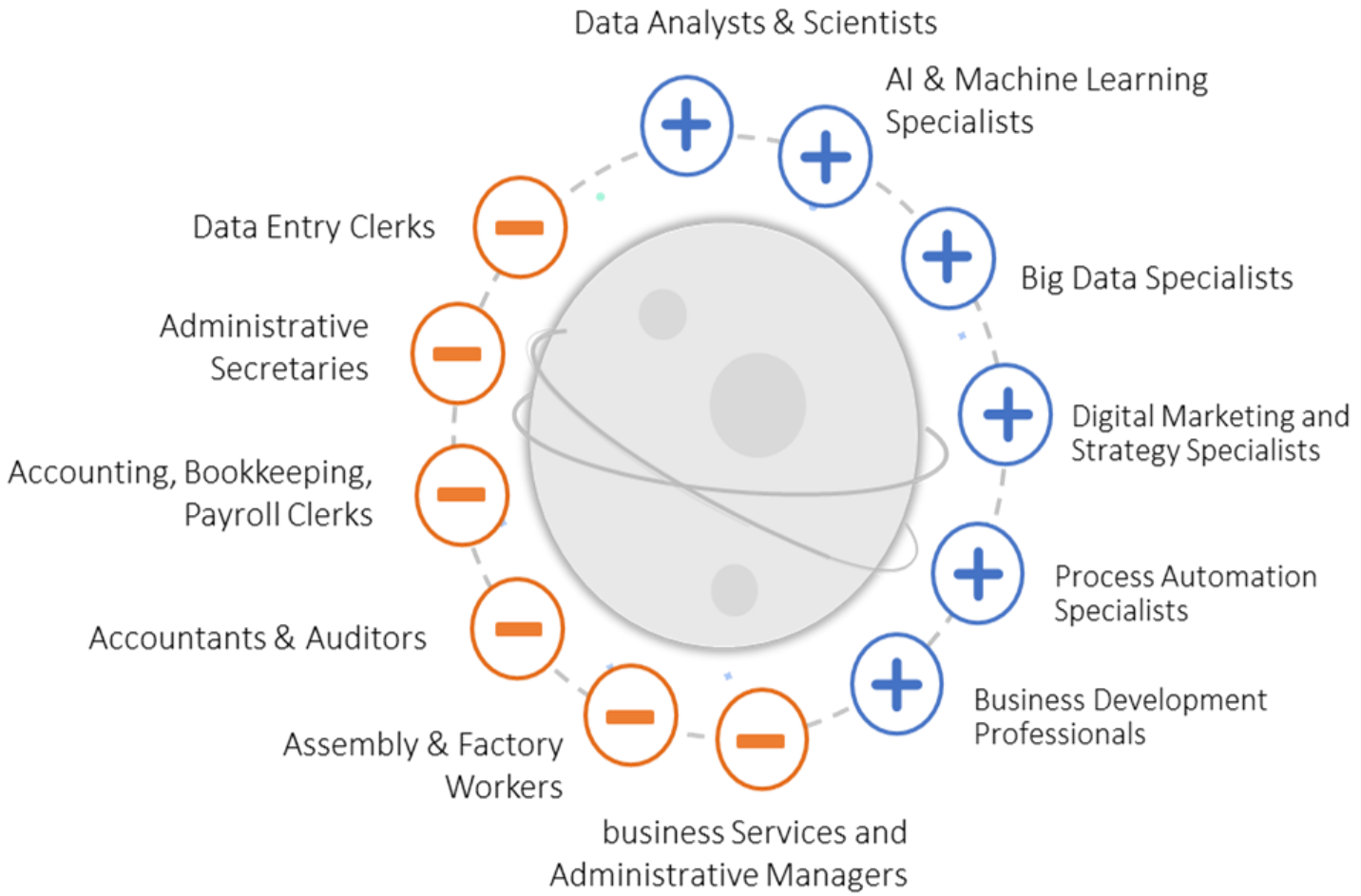
85 million

New job types, tasks, and roles

97 million

New forms of work - gig work

Constant upskilling and reskilling



Source: World Economic Forum 2020.

The current state of AI in education

AI used in education worldwide is expected to reach $53.68 billion by 2032, from $2.48 billion in 2022.

$2.5 billion

CAGR 36%

$53.7 billion

How students feel about AI in education

Cryptopolitan’s UK survey of 1,000 students found that…

68%

of students felt that AI had had a direct positive impact on their academic results and performance.

67%

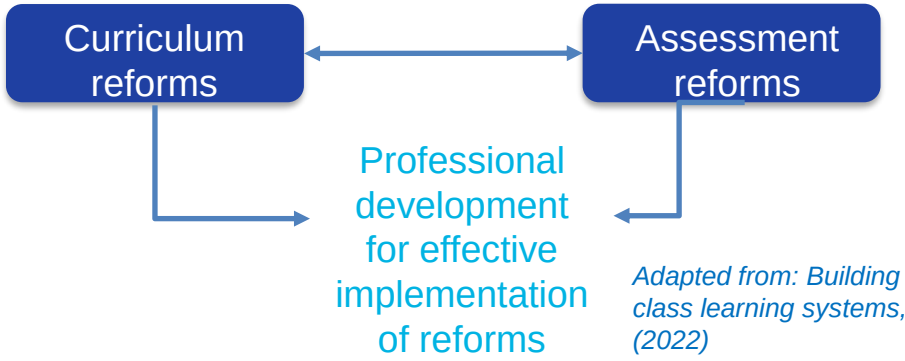
of students said they used AI in some capacity.

Mismatch: A systemic issue

How we learn (needs of students)	Students within a class are not at the same learning level.
	Every learner follows their own individual learning path.
	Heterogeneity is high for low-medium performing learning systems (within school)
	Learning is a continuous process.
How we are taught (Existing system gaps)	Same curriculum is transacted to all students of a class.
	Same learning goal is set for all students of a class.
	Same teaching-learning method is adopted for all students in a class.
	Grades are designed as compartments.

This mismatch between how we learn and how we are taught may well be the most important factor contributing to the learning crisis.

How to improve teaching & learning using edtech and AI



Adapted from: Building a world-class learning systems, Masters (2022)

Case studies from five high performing learning systems – British Columbia, Estonia, Finland, Hong Kong and South Korea

The school curriculum is centrally developed and is **explicit in differing degrees of detail** what teachers are to teach and students are to learn.	Co-pilot for teachers and personal tutor for students.
Students are usually graded on how well they have **mastered the content and met expected standards.**	Digital assessment of students' competences.
Teachers are very **well prepared in the subjects** they teach, and **significantly more autonomous.**	Digitized teacher professional development.
Systemic approaches are used **to identify and support individuals who fall behind** in their learning.	Personalized and adaptive learning.
Education is **highly valued** as a path to personal fulfillment and success.	Development and assessing non-cognitive competencies.

Teaching at the Right Level (TARL)

First initiated by the NGO Pratham in India, refined in partnership with MIT's J-PAL

To improve foundational literacy & numeracy skills in 3-8 years old

How Does it work

Step 1

Simple one-on-one assessment for students in grades III-V, to regroup them by learning level rather than by grade

Step 2

Teachers or instructors allocated to facilitate individual and group activities appropriate for their level

Step 3

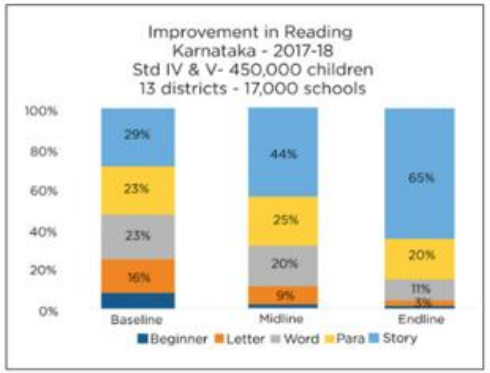
Similar assessment used for tracking children's progress, periodically and to guide onsite monitoring

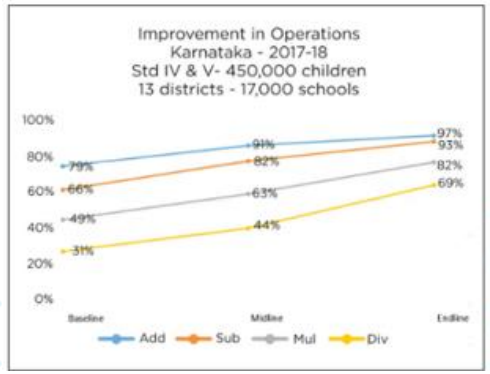
Step 4

As children make progress they move into the group of next learning level

Adopted by as many as 12 countries in Africa, including Kenya, Nigeria, and Zambia. Based on the findings of an evaluation of the programme conducted by ACER in 1800 Zambian schools, the programme was scaled up to all provinces of Zambia.

Evidence of Impact





Challenges

Integration of New Curricula and Assessment Systems

- Challenges with transitioning to new educational standards (CAM, PHI).
- Difficulty in mapping new competency-based curricula to adequate assessments (BAN, KYR, SRI).

Quality and Accessibility of Assessments

- Inadequate quality of school-based and classroom-based assessment items (CAM).
- Issues with the availability and effectiveness of teacher training on new assessment methods (PHI, KYR).
- Inconsistent access to learning materials e.g., textbooks, which hinders effective implementation of curricula (CAM, PHI).

Technological and Infrastructural Barriers

- Limitations in the capacity to conduct online or digital assessments due to lack of infrastructure (PHI).
- Need for modernization and digital transformation of national assessment systems (CAM, KYR).

Opportunities

Digital Transformation and Technology Integration

- Cambodia: Transition to digital or online-based assessment systems.
- Cambodia: Develop competency-based assessments tailored for STEM education.
- Philippines: Update and enhance computer-based assessment platforms.
- Philippines: Develop audio-visual materials for national assessments.

Competency-Based Curriculum and Teacher Training

- Bangladesh: Provide technical support for blended teacher training on competence-based curricula.
- Bangladesh: Develop and implement formative assessments for psychomotor and affective skills.
- Cambodia: Train teachers on developing and using formative assessment results to improve instruction.
- Kyrgyzstan: Develop courses for the professional development of teachers in line with new curricular demands.

Assessment Improvement and Pedagogical Support

- Bangladesh: Digitalize teaching and learning materials, including textbooks.
- Philippines: Support the National Learning Recovery Program to enhance assessment frameworks.
- Sri Lanka: Implement a systematic feedback mechanism for assessments at various educational levels.
- Sri Lanka: Support capacity development in assessment and curriculum frameworks.

Policy Development and Infrastructure Enhancement

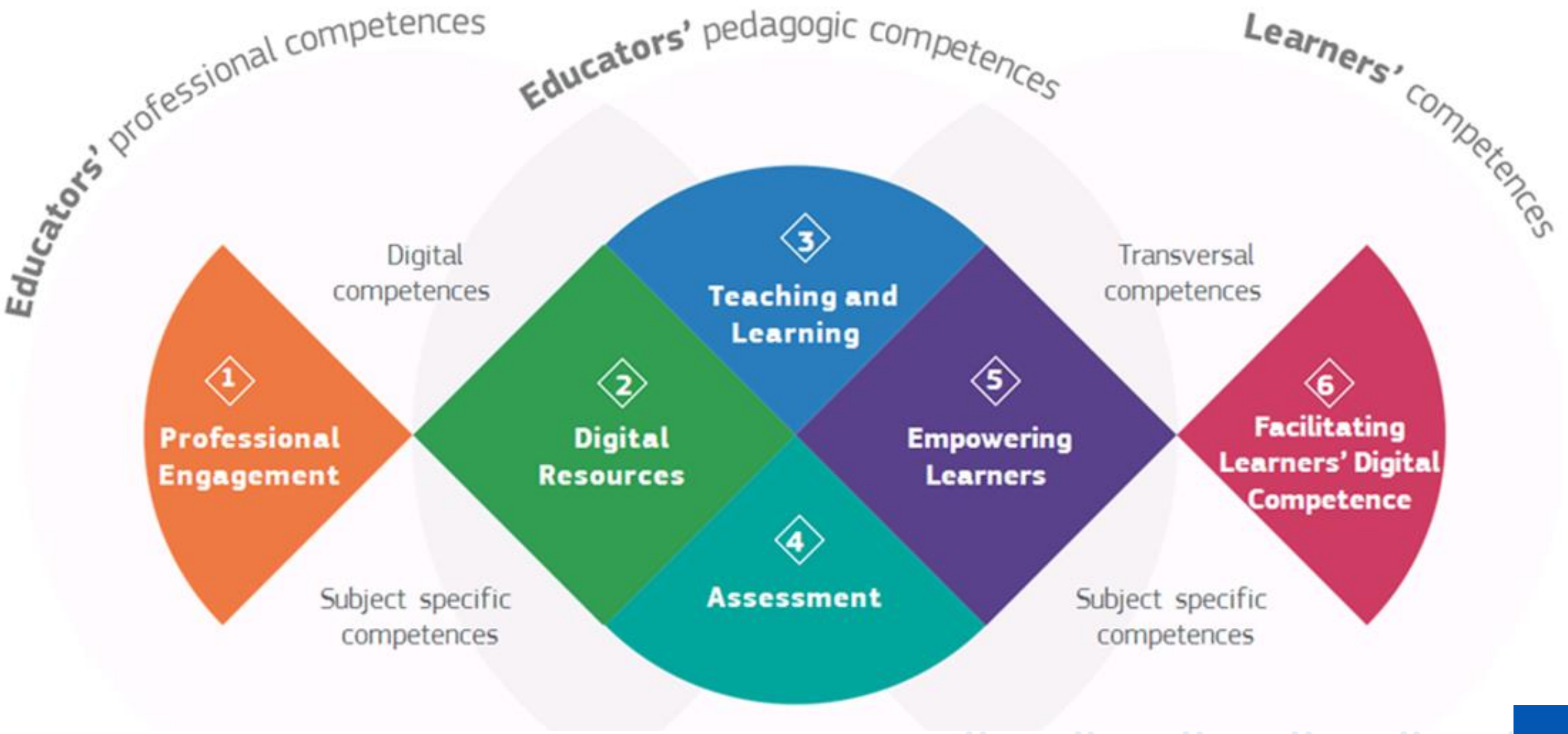
- Sri Lanka: Develop guidelines for research related to educational system improvement through assessment.
- Sri Lanka: Integrate performance analysis technologies and international best practices.
- Kyrgyzstan: Facilitate research and updates in the teaching-learning process including AI and distance education.
- Kyrgyzstan: Support projects that finance improvements in educational infrastructure and technology use.

Assessing teachers' digital and AI competencies

What is Teacher’s Digital Competency?

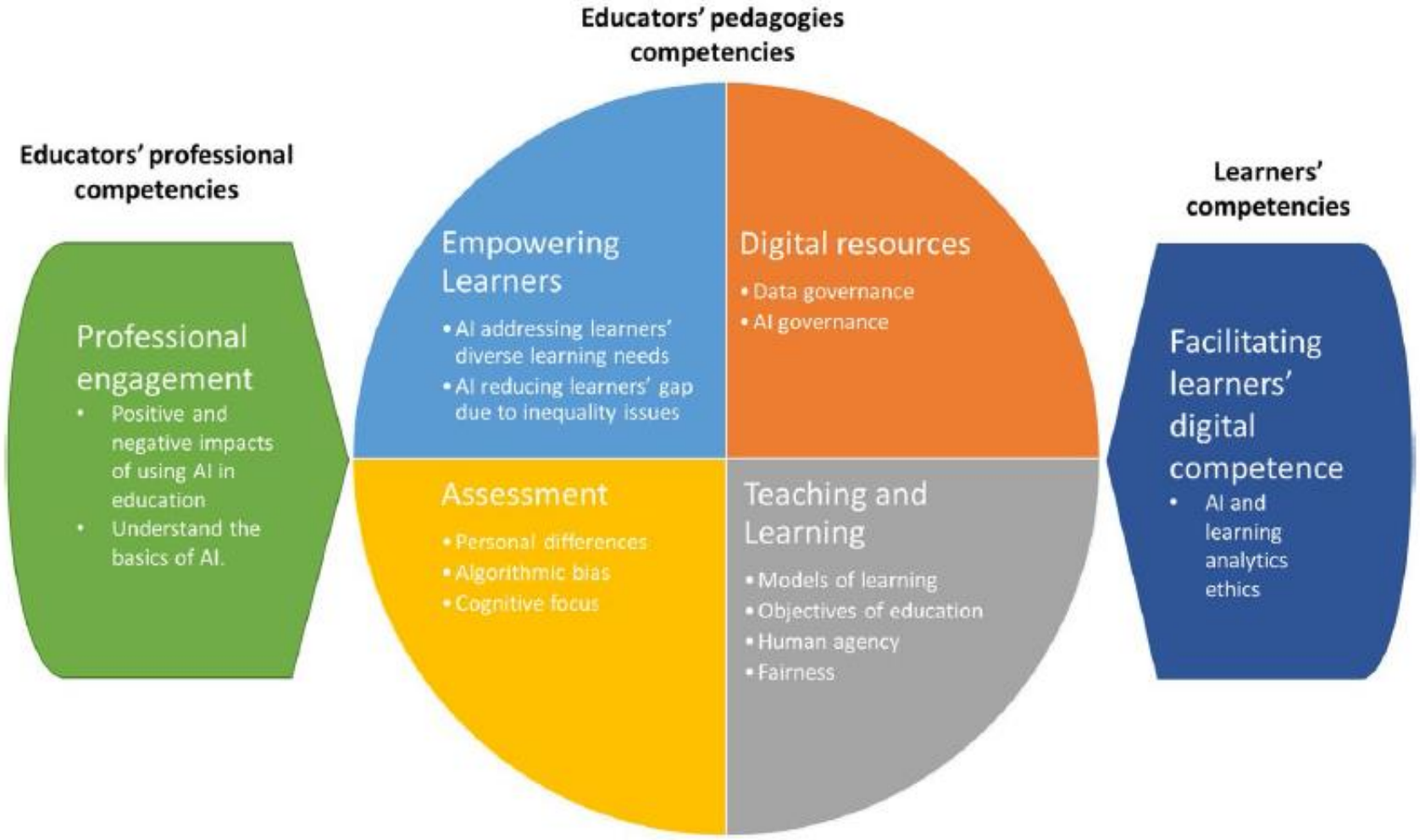
- Teachers' proficiency in using technology in a professional context.
- Good pedagogic-didactic judgement.
- Awareness of its implications for learning strategies.
- Technologies are considered as a way to support pedagogical knowledge and methods.

Teacher Digital Competency Areas



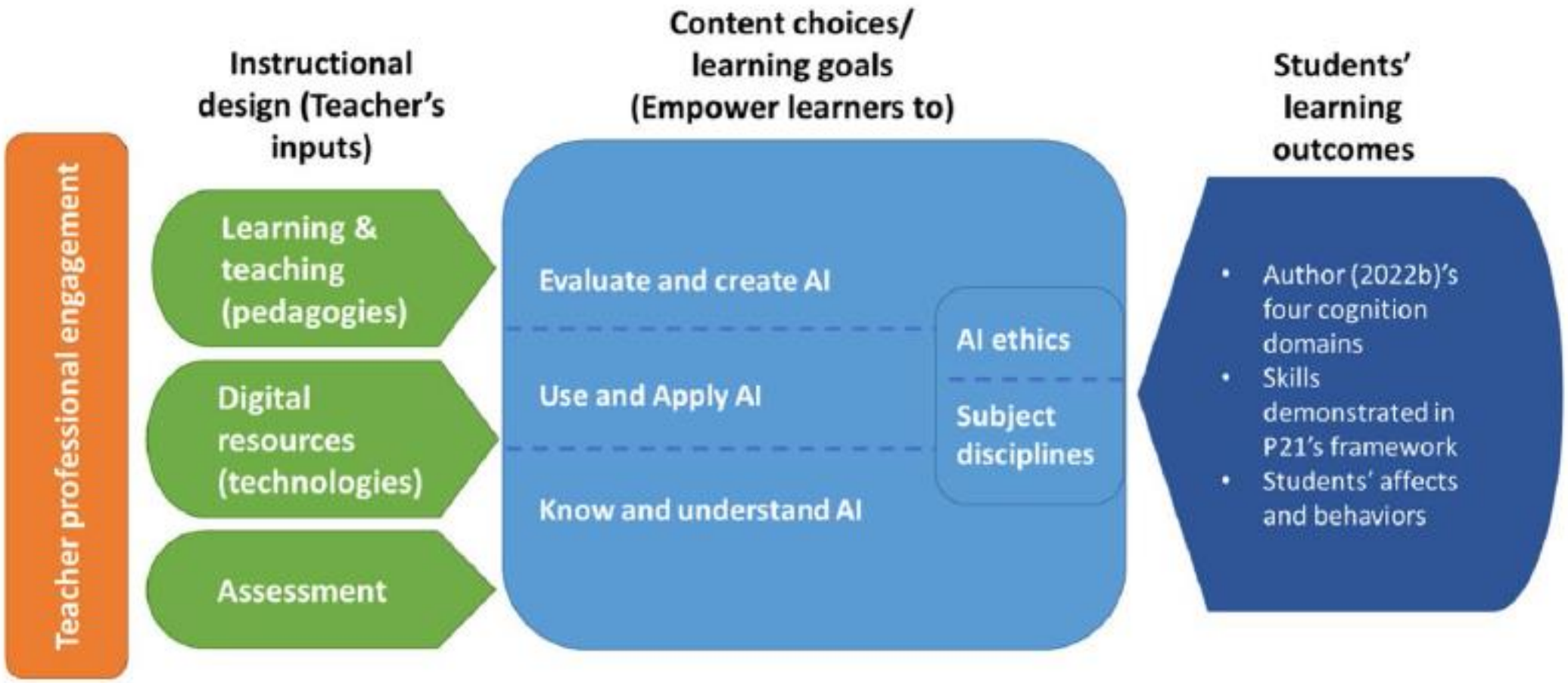
Teacher Digital Competency Areas (detailed)

Teachers' AI literacy (digital) competencies



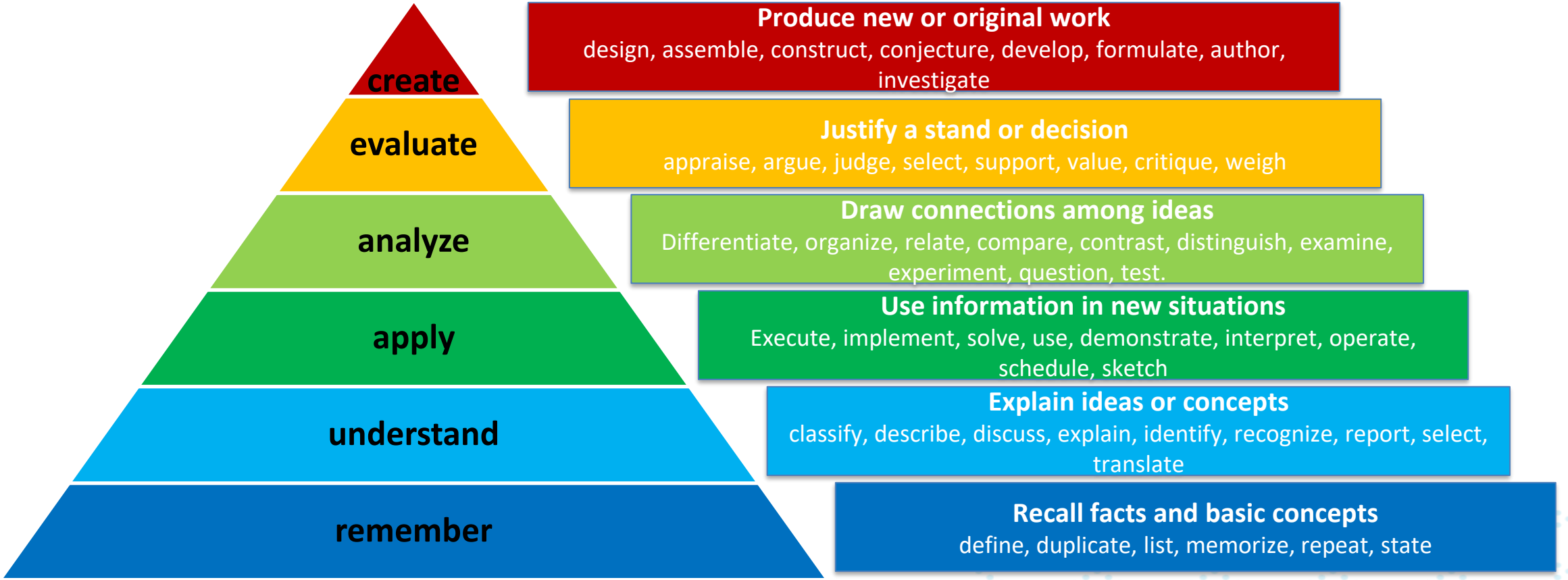
Source: DigCompEdu framework for teachers' AI competency (European Commission, 2022)

Instructional design framework for AI competencies in education



Source: Davy Tsz Kit Ng et al (2023), Teachers' AI digital competencies and twenty-first century skills in the post-pandemic world, Education Tech Research Dev.

Competency areas and Bloom's Taxonomy



Competency areas and Bloom's Taxonomy

A proposed AI competency framework for teachers

Aspects	Progression		
	Understand	Apply	Create
Mindset on AI and education	Understanding benefits & risks	Contextual strategies	Steering long-term impact
Ethics of AI	Human agency	Human-centred use	AI society skills
AI foundational knowledge	Algorithm and data literacy	Use AI analytics	Coding and data models
Application skills	Test and use	Infusing uses	Integrating AI tools
AI pedagogy	AI for teaching	AI to deepen learning	AI for co-creation
Professional development	AI to assist administrative tasks	AI for curriculum design and delivery	AI empowering teaches

Source: Fengchun Miao, Chief of Unit for Technology and AI in Education at UNESCO.

TDC competency areas mapped to AI competencies

Professional engagement

- AI-driven tools and systems can help teachers develop and improve organizational communication strategies.
- AI could enable teachers to share and exchange knowledge, teaching experiences and pedagogies.

Digital resources

- AI can help source, create, and share teaching resources to fit learning goals, needs and teaching style.
- AI engines can recommend specific learning activities and resources based on students' preferences, progress and needs.

Teaching and learning

- AI can support instruction and help teachers and design interventions and develop teaching processes.
- AI can help develop pedagogical approaches that are highlight engaging and interactive (project-based, gamified learning, etc

Assessment

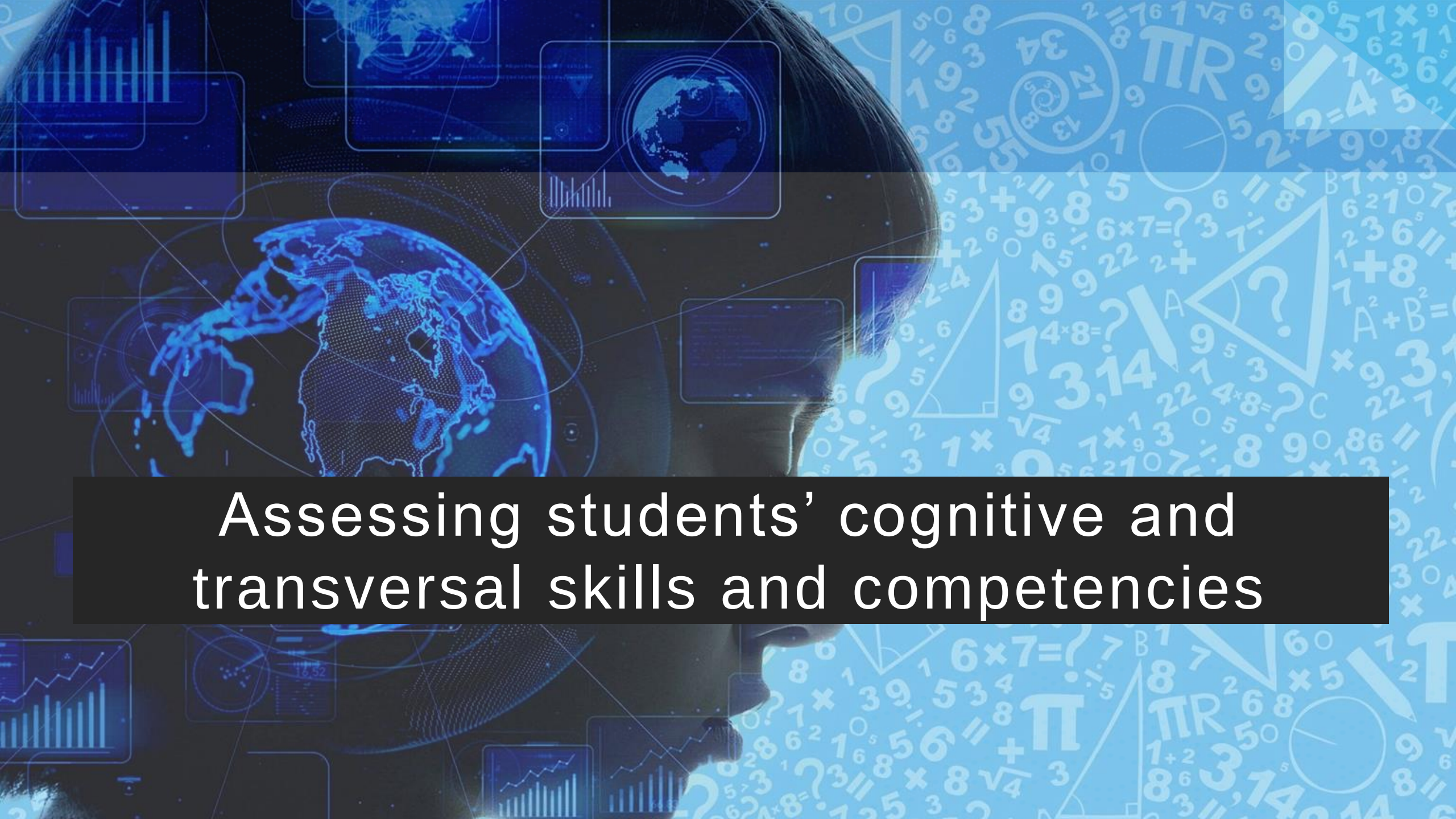
- AI enhances learning assessment through tools like writing assistants (e.g., for grading and evaluating student work).
- AI tools and dashboards help teachers visualize learning patterns, interpret feedback, and adapt teaching methods to monitor and enhance student progress.

Empowering learners

- AI can enhance personalized learning through tailored strategies and individualized paths for diverse student needs.
- AI can help improve accessibility and inclusion by using advanced tools to eliminate barriers for learners with disabilities.

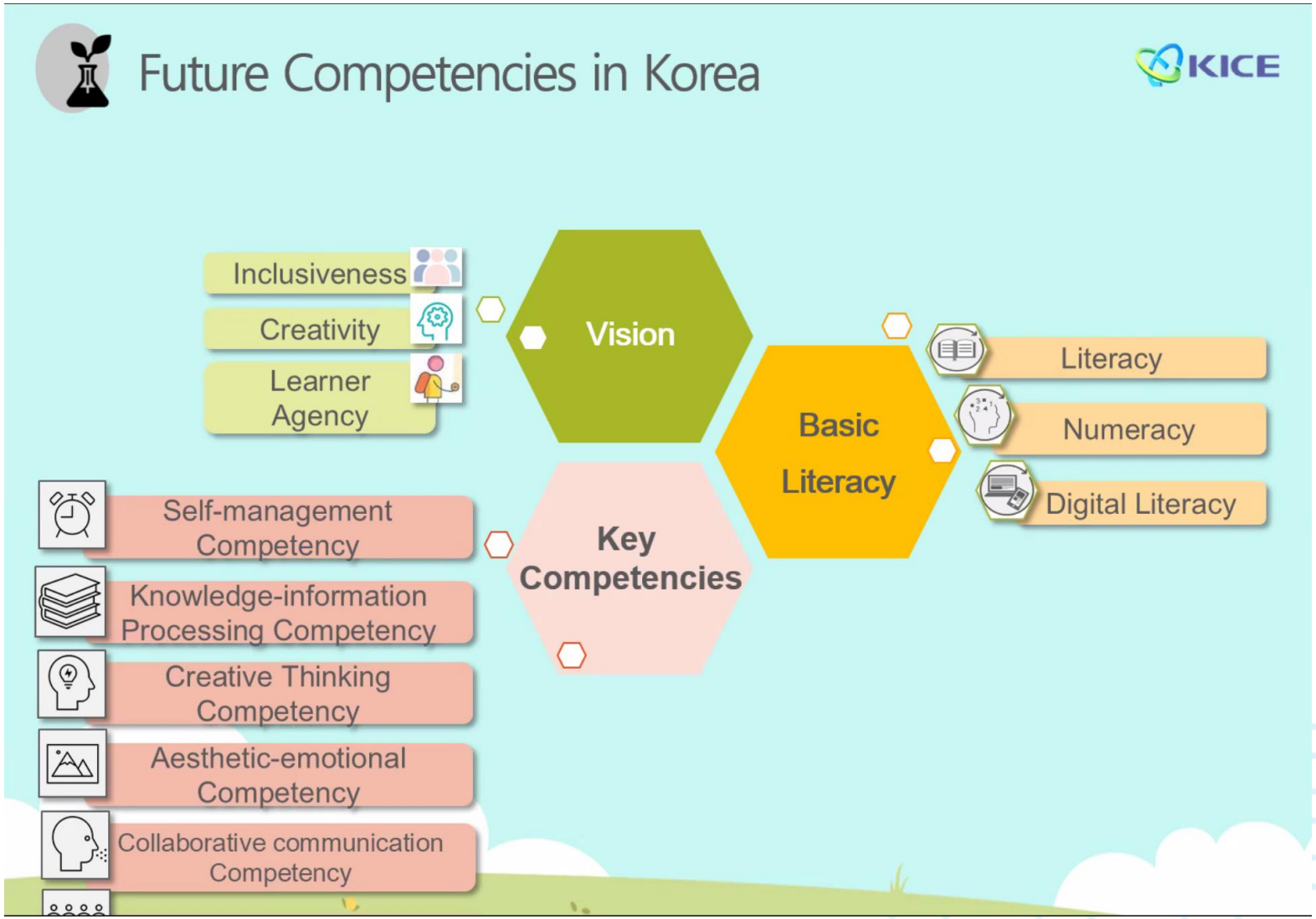
Facilitating learners' AI competency

- AI can help information literacy and promote ethical AI use, integrating it responsibly into learning and assessments.
- AI can help enhance creativity and problem-solving by equipping students to create content and collaboratively tackle real-world issues.

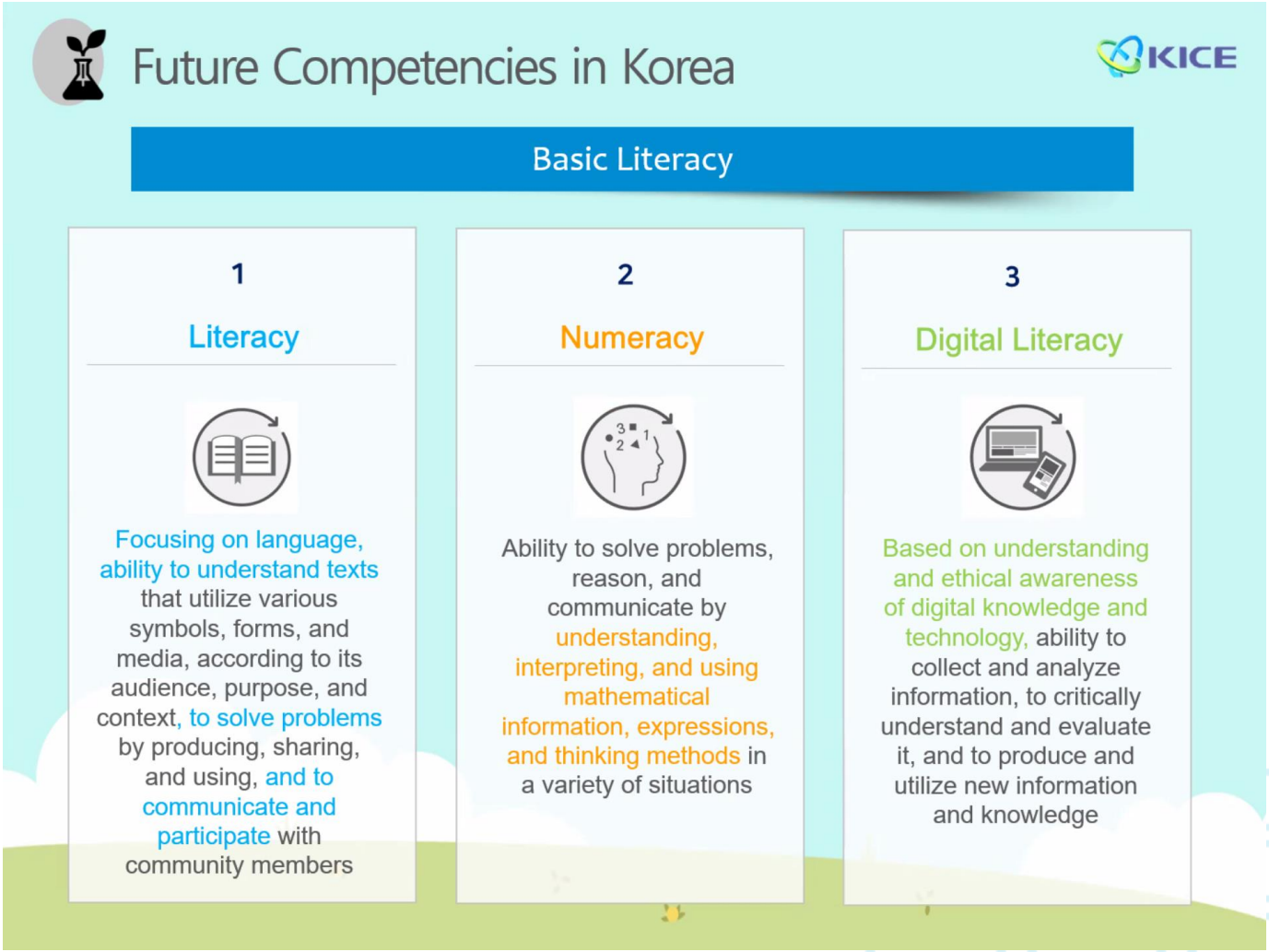


Assessing students' cognitive and transversal skills and competencies

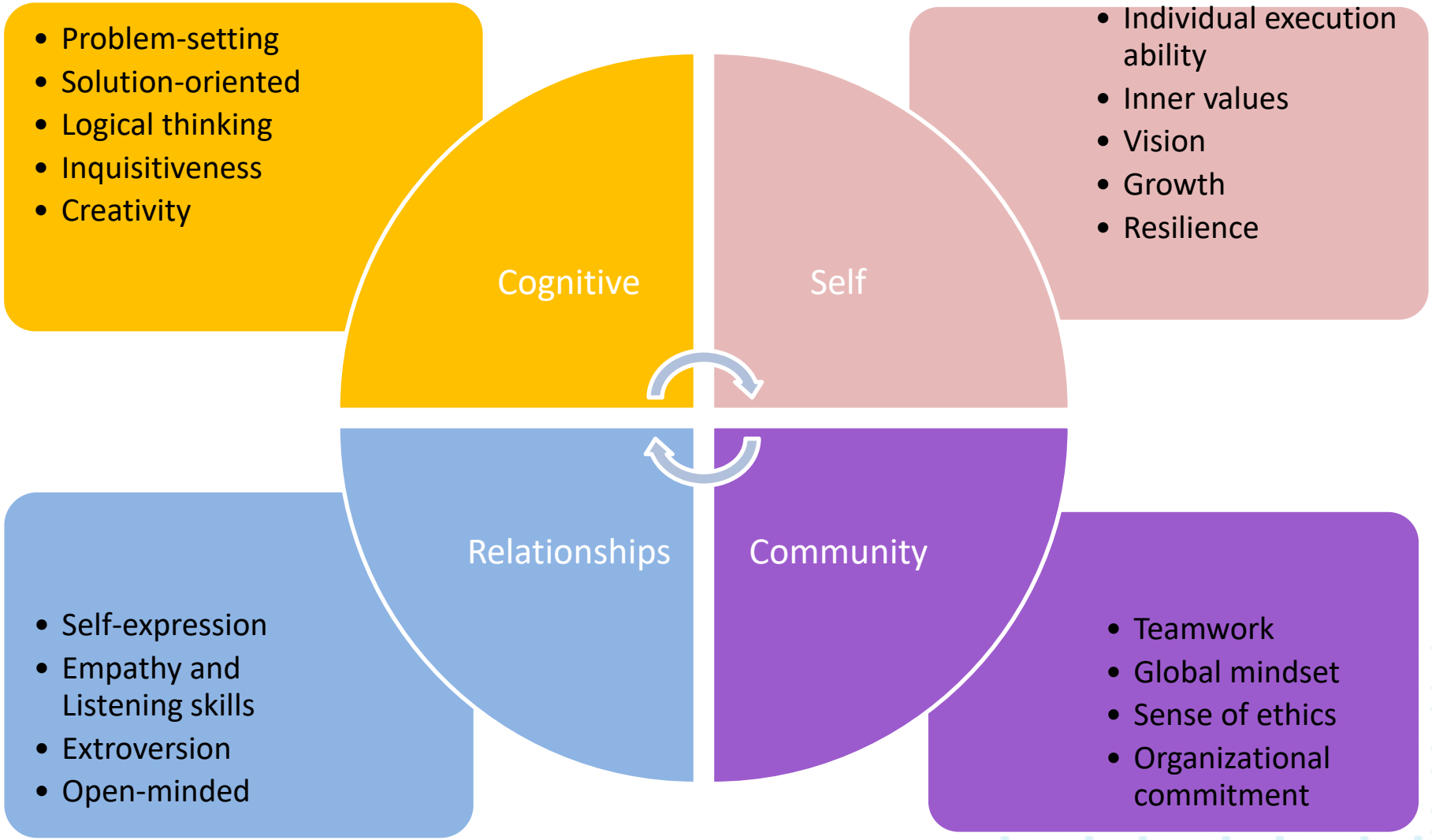
Future Competencies (South Korea)



Current AI based assessments (South Korea)



Future Competencies (Japan)



Current AI based assessments (Japan)

- AI –based digital assessment tools on scientific inquiry and non-cognitive and transversal skills.

Mathematical Science Skills Assessment

Absolute Evaluation

Mathematical scientific way of looking at things and thinking is evaluated by simulator testing

Measurement Time 50min.

Feature
1. video questions are included
(To see if the student are influenced by impressions or the content of the presentation or not)
2. evaluation of creativity through descriptive questions
3. questions from the real world and real life

Question Format
- Multiple choice
- Point Distribution
- Descriptive

Evaluation
Each question: rated from LEVEL 1 to 4
Each item: rated from LEVEL 1 to 4

1. Problem-setting skills (3 questions)
Ability to formulate testable hypotheses

2. Ability to design experiments (4 questions)
Ability to extract and control variables when designing experiments

3. Ability to consider (3 questions)
Ability to consider conclusions, suggestions, data, etc. from multiple perspectives in a critical manner.

4. Creativity (2 questions)
Ability to create original ideas

Ai GROW

"Ai GROW" evaluates ability to collaborate and solve problems with a questionnaire

360-degree Evaluation

Reasons for conducting peer evaluations
Self-assessment alone causes discrepancies with the actual situation.

Measurement Time 30min.

Bias exclusion by AI

1. Individual Execution Ability
Ability to tackle anything willingly and on one's own initiative

2. Decisiveness
Ability to make decisions by comparing one's own ideas with objective facts

3. Self-Expression
Ability to communicate things in a way that others can easily understand

4. Flexibility
Ability to flexibly control the way things are done

5. Empathy and listening skills
Ability to listen seriously and try to understand what the other person is saying

6. Cooperativeness (Self efficacy + Exercise of Influence)
Ability to work with people with diverse values and opinions to achieve goals

AI driven smart classrooms for personalized learning and assessment

How AI helps transform traditional learning into adaptive learning

Traditional Learning

What Instructors Do

- Find content
- Organize content
- Edit content
- Respond to students

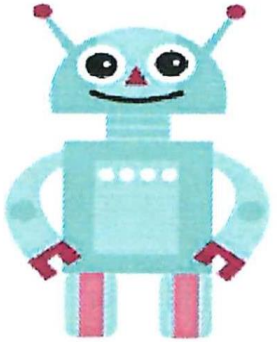
What Students Do

- Everyone gets the same content
- If you miss a concept you are left behind
- Everyone moves at the same pace

Adaptive Learning

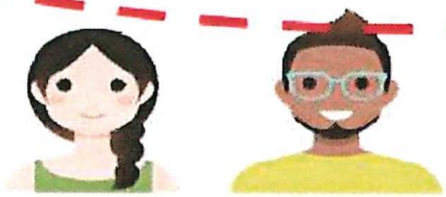
What Instructors Do

- Decide what to teach
- Coach, manage and engage students



What Adaptive Tech Does

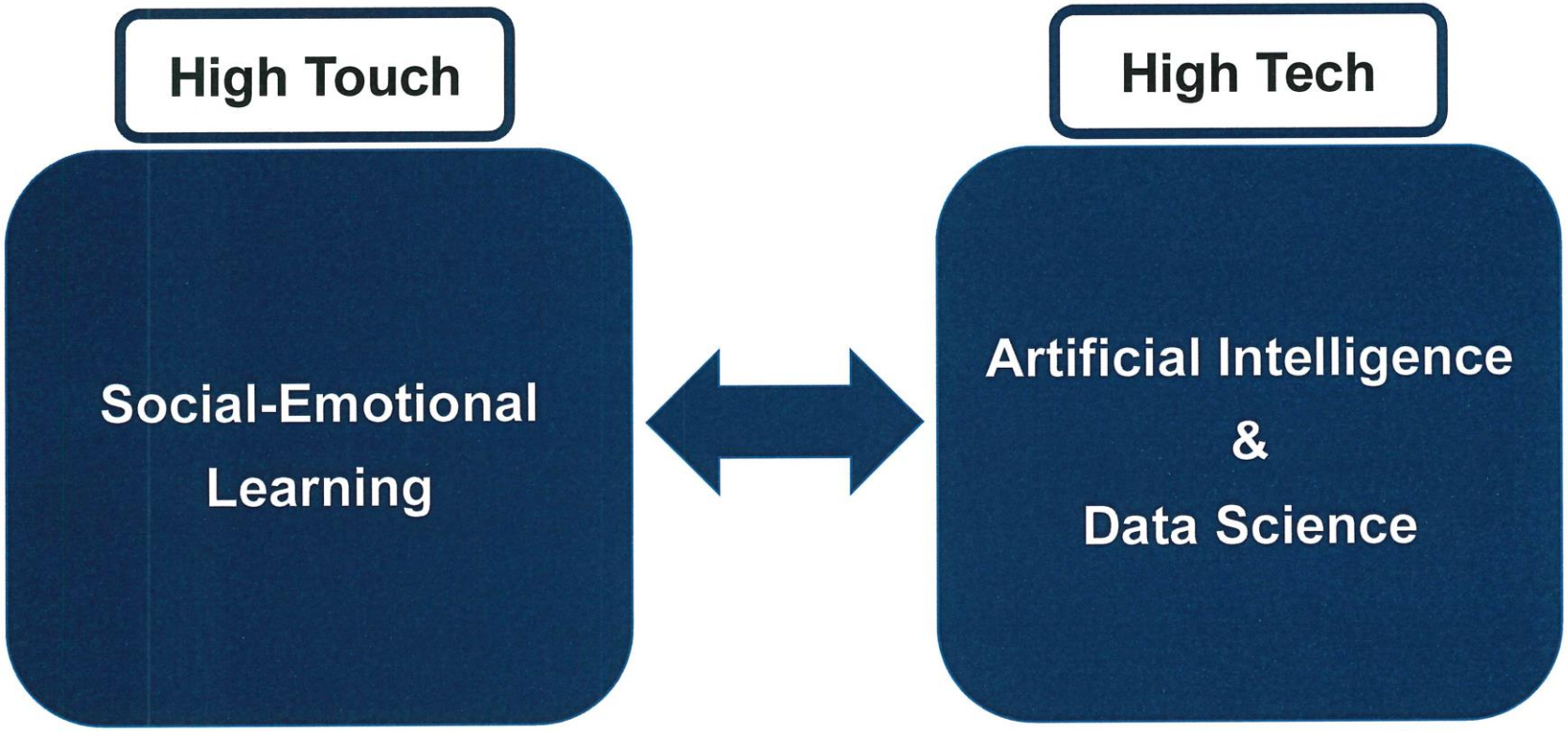
- Finds best content
- Links concepts to content
- Adjusts based on content and student success



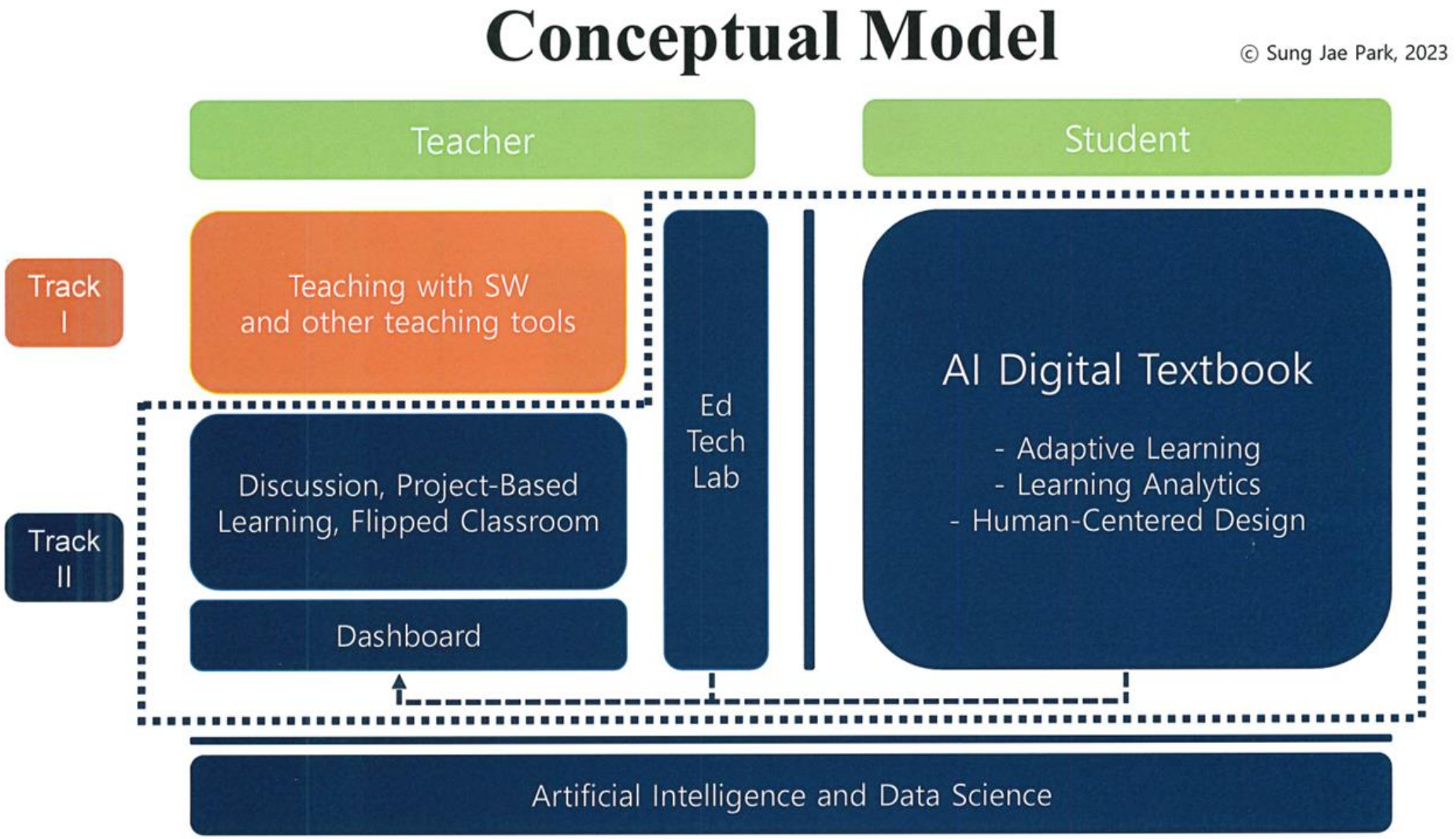
What Students Do

- Get a learning plan just for them
- Skip concepts they know
- Get recommendations
- Master all concepts

High-Touch High-Tech (HTHT) learning in schools



Conceptual model of HTHT learning



EdTech Use Cases for various levels of tech infrastructure

We categorise EdTech use cases in three different categories based on the IT infrastructure. The characteristics of formative assessment EdTech tools are divided between these three categories.

Low-Tech Environment

Limited access to devices

Limited access to Internet

Medium-Tech Environment

Use of own or shared devices

Timely access to Internet in school

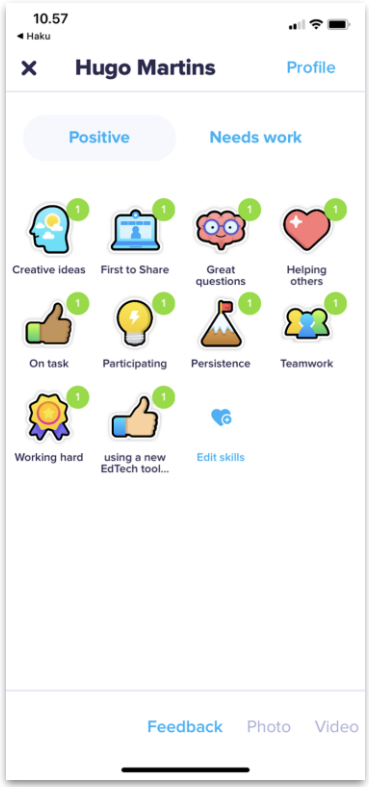
High-Tech Environment

Students have personal devices / high device per student ratio in classrooms

Steady (broadband) connection in school and home

Case examples: teacher-led performance data collection online & offline (suitable for low-tech environments)

ClassDojo



Teacher can give feedback and keep record of student's actions during the lesson. Offline use possible.

Plickers

The teacher uses a video projector to ask questions and the students answer them using Plickers cards. Everyone's answers and performance is stored in the Plickers app. Offline use possible.

Case examples: ClassSaathi by TagHive, formative assessments data da collection through clicker devices (suitable for low-tech and offline environments)

Class Saathi

Inside Classrooms

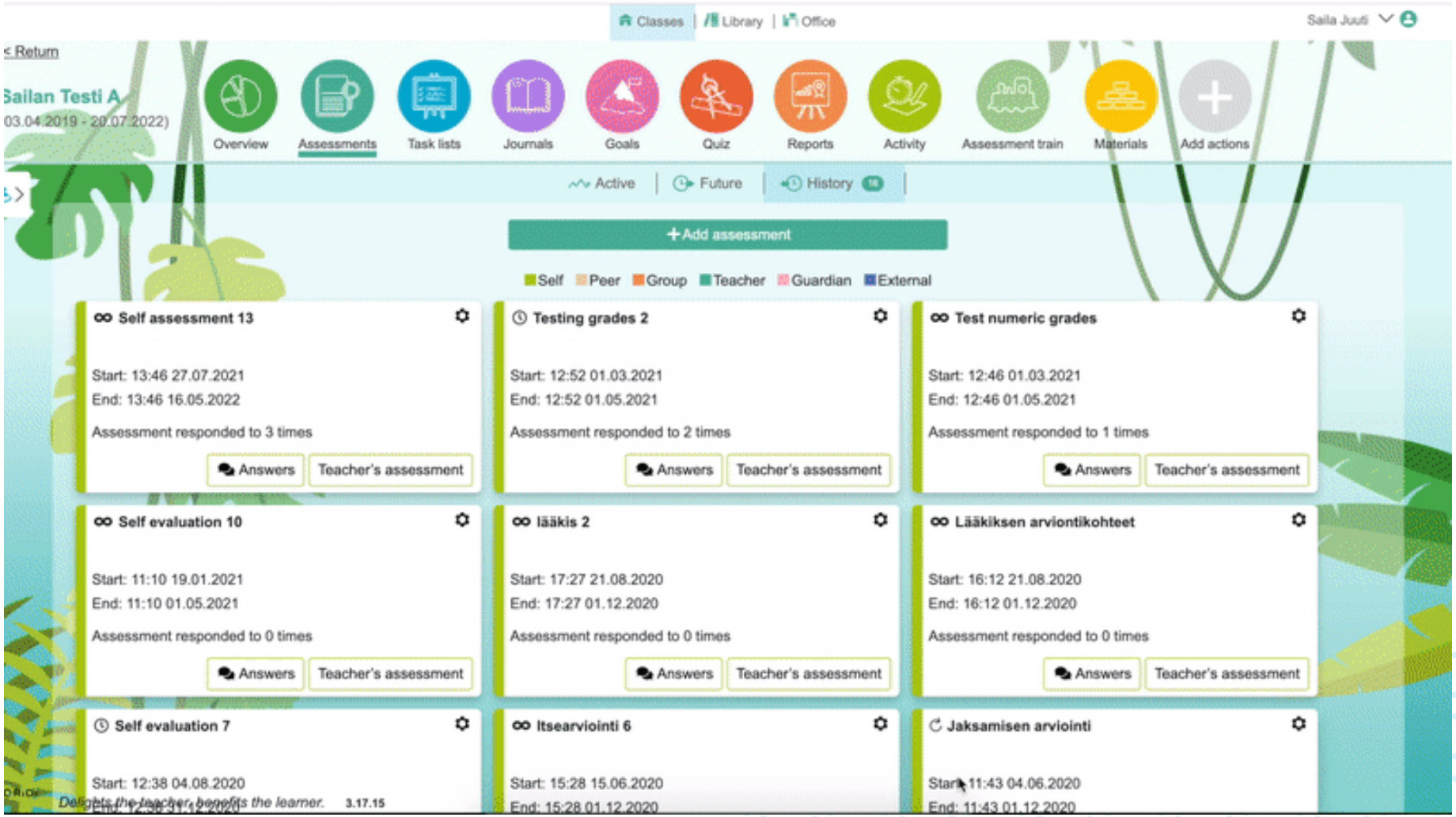
- **World-First** clicker to work with a smart phone
- **No internet/electricity required** in classrooms
- Can be used for **any** grade/subject/language/curriculum

Clicker
for students

App
for teachers

Case examples: student-centered assessments using formative assessment platform (suitable for mid to high-tech environments)

Qridi platform allows creating all assessments in one place. It provides assessment templates and supports self-evaluation, peer evaluation, grading, etc.

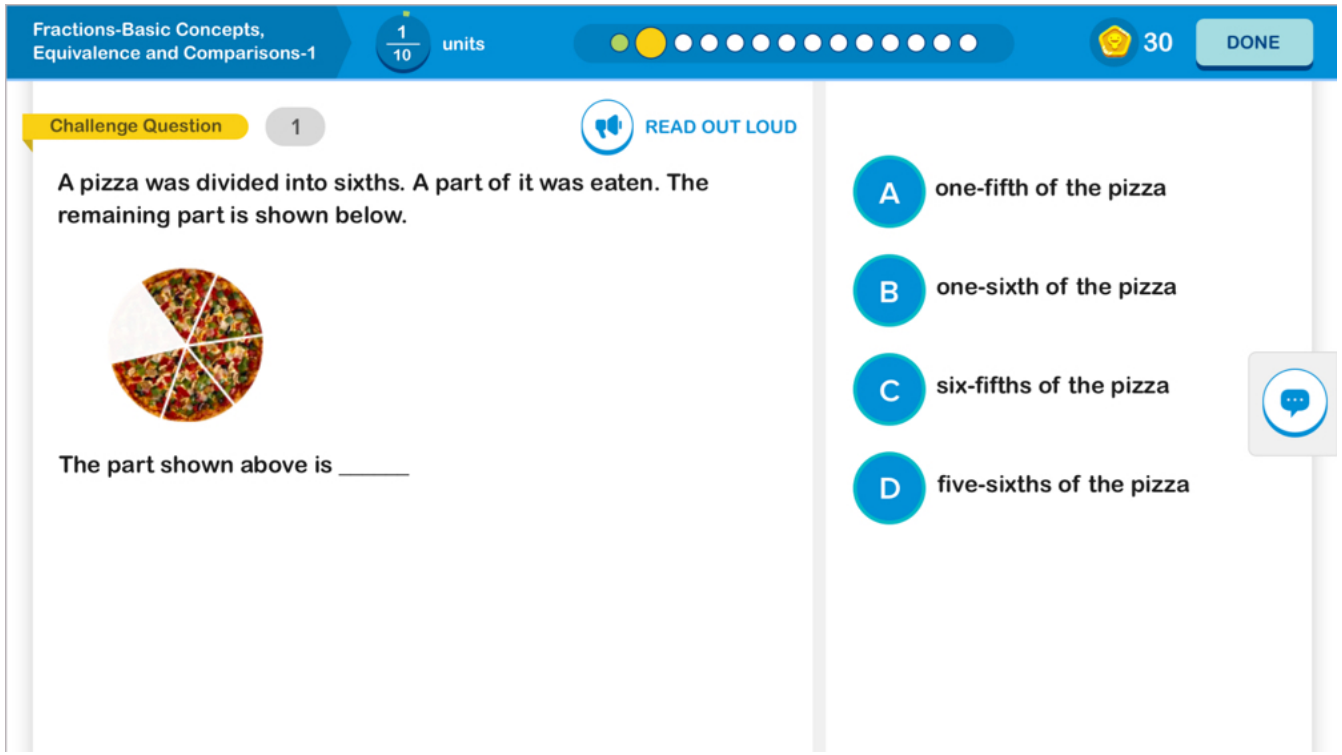


Case examples: student-centered assessments using formative assessment platform (suitable for high-tech environments)

SeeSaw - Learning portfolios

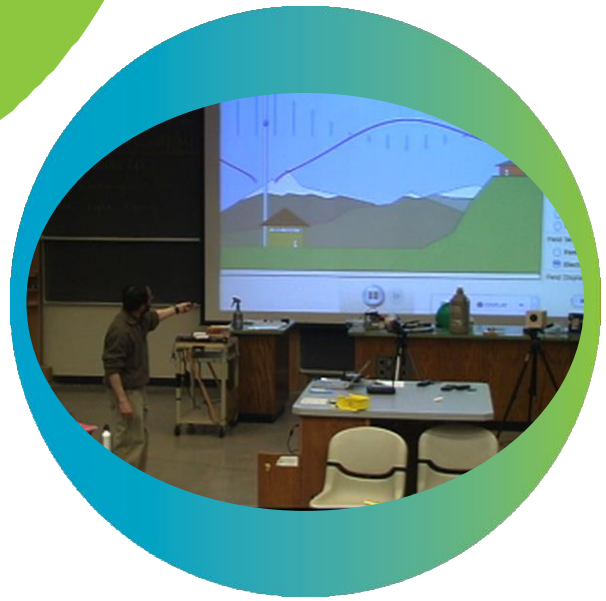
FreshGrade - Learning portfolios

Case examples: Learning platforms with assessment features (suitable for mid to high-tech environments)



MindSpark Adaptive Math Platform

ELSA Speak language learning app



Thank you!

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Examples of AI education projects in US and China.

US	China
• EducateAI Initiative: Funded by the US government to support the creation of high-quality, inclusive AI educational opportunities at the K-12 through undergraduate levels.	• AI Education Bases: A list of 184 base schools designated by the MOE to explore AI education concepts, models, and approaches.
• NSF AI Institute for K-12 Education: Collaborates with educators and researchers to develop AI education resources and curriculum materials.	• AI-assisted Teacher Development Action: Pilot project for enhancing the AI teaching workforce, involving various universities and districts for teacher training in AI.
• Consortium for School Networking (CoSN): Provides leadership, advocacy, and resources for school leaders to integrate AI into education.	• Specialized AI Education Program: A selective approach implemented by China to enable selected schools with specialized AI programs and resources.
• TeachAI: Offers professional development programs and resources for educators in AI education.	• AI Textbooks and Curricula Collaboration: Partnerships with AI and tech companies like SenseTime and iFLYTEK to co-design AI curricula and textbooks.
• AI4K12 Initiative: Develops guidelines for AI education for K-12, providing an online directory to facilitate AI instruction, and fostering a community of practitioners.	• Beijing Normal University and East China Normal University: Support AI textbook and curriculum development.
• California's Computer Science Standards: Includes AI education as part of the comprehensive standards for teaching foundational concepts critical to AI.	• Tsinghua University: Collaborates with schools for AI science outreach activities and curriculum development
	• Zhejiang University: Specializes in creating intelligent educational robots and systems for personalized learning experiences.

Different Strategies (from US and China) for integrating AI in education

Strategies	Detailed description
Educator Empowerment	**Professional Development for Educators**: Initiatives to provide educators with ongoing training to develop skills necessary for integrating AI tools into teaching, focusing on AI content creation, learning experience customization, assessment, and understanding the ethical aspects of AI use.
Curricular Integration	**Interdisciplinary Approaches**: Encouraging the incorporation of AI across various subjects beyond computer science to demonstrate its real-world applications, including ethics, psychology, data science, and engineering. **Curriculum Development and AI Literacy**: Efforts to develop AI-focused curricula and promote AI literacy among students and educators, ensuring a comprehensive understanding of AI principles and technologies.
Student-Centered Learning	**Personalized and Holistic Education**: Leveraging AI technologies like virtual tutors and personalized learning platforms to tailor educational content to individual student needs, while also emphasizing the development of soft skills.
Collaborative Efforts	**Public-Private Partnerships**: Highlighting the role of private sector collaborations in advancing AI education through the provision of AI-powered tutoring systems, curriculum design, and textbook development.
Policy and Regulation	**Regulatory Framework and Policy Support**: Implementation of policies to guide AI's development and deployment in education, including efforts to promote safe and responsible AI use and ambitions to lead in AI innovation.
Equity and Accessibility	**Addressing Disparities**: Recognizing and working to close the gap in AI higher education access and quality between different geographic locations and economic backgrounds.
Societal Preparedness	**Preparing for Societal Impacts**: Educating students about the broader societal impacts of AI, including ethical considerations, bias, data privacy, and the importance of a human-centered approach.
Innovation and Research	**Fostering Research and Innovation**: Emphasizing the importance of research and collaborative efforts to develop new AI education resources and methodologies, including initiatives like AI Education Bases and national institutes focusing on AI education innovation

What is Formative Assessment?

- ✓ Assessing student's progress, gathering data and evidence on student learning in real time.
- ✓ Formative assessment data can be used to modify learning paths, help student's self-reflection, grading.