Artificial Intelligence and Expected Changes in Education

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CONTENTS

Technology in Education

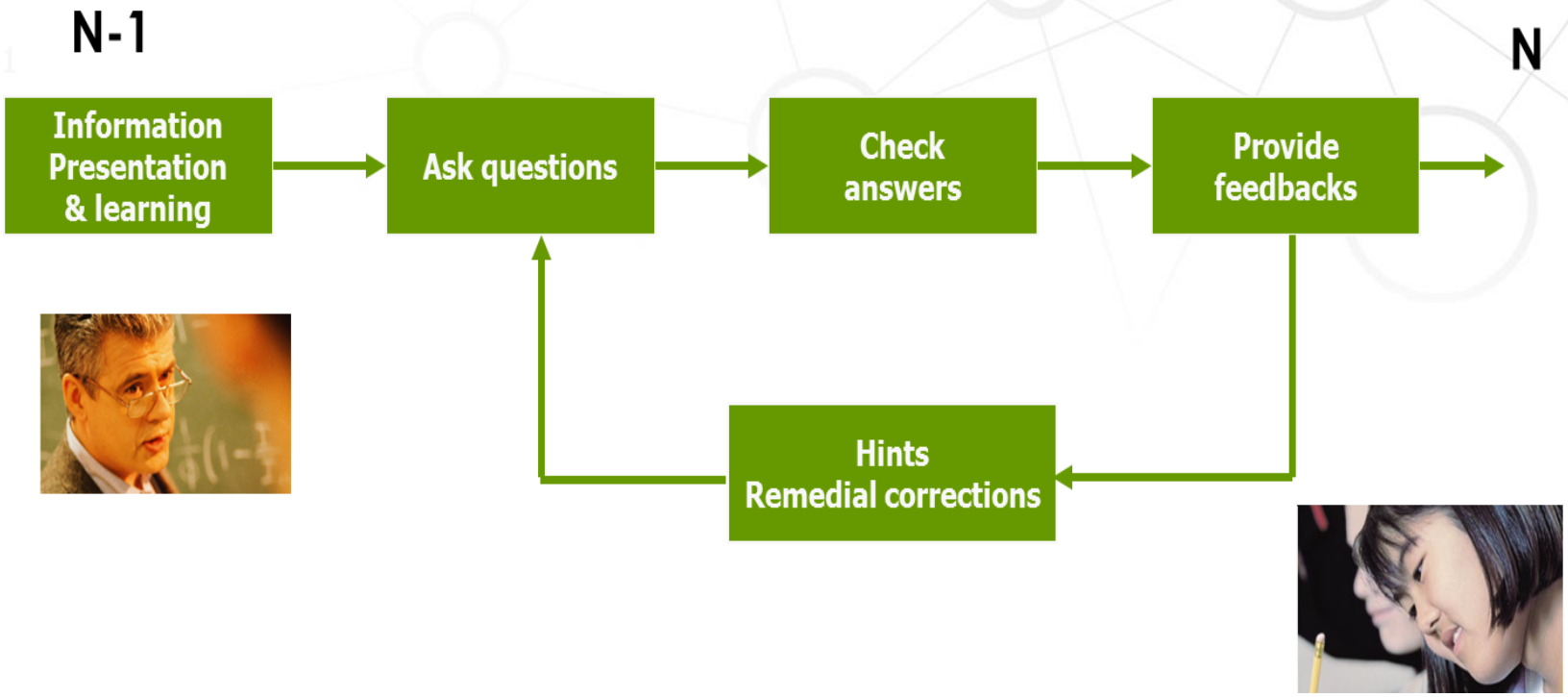
- The use of ICT in education can play a crucial role in providing new and innovative forms of support to teachers, students, and the learning process more broadly

- Technology may enhance teacher engagement with students through access to content, data and networks

- Allowing teachers to focus on personalized student learning

Model of Teaching-Learning Process

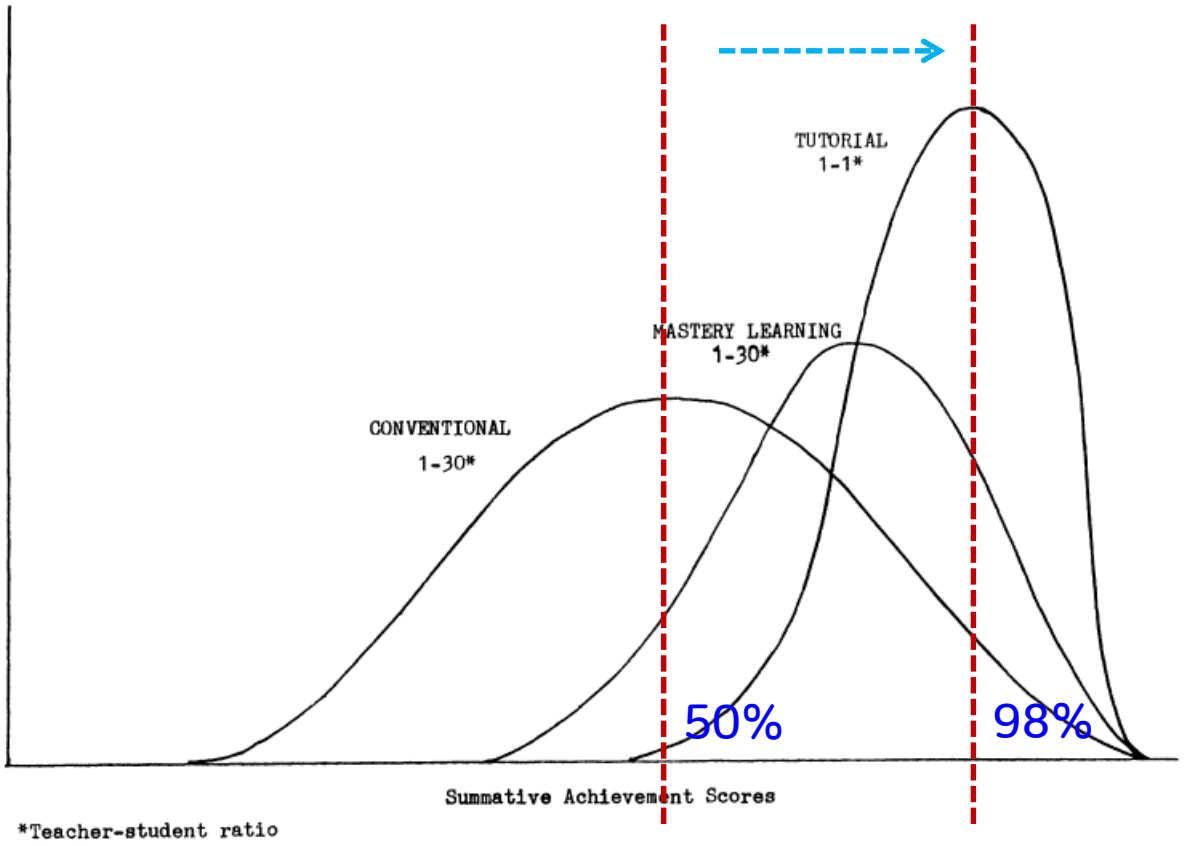
- Traditional learning process



'Two Sigma'Goal

- Benjamin Bloom's "2-Sigma" Goal

FIGURE 1. *Achievement distribution for students under conventional, mastery learning, and tutorial instruction.*



Bloom, B. (1984) The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. Educational Researcher, June/July, 4-16.

Teaching Strategies and Effects

Object of change process	Alterable variable	Effect size	Percentile equivalent
Teacher	Tutorial instruction	2.00	98
Teacher	Reinforcement	1.2	
Learner	Feedback-corrective (Mastery Learning)	1.00	84
Teacher	Cues and explanations	1.00	
Teacher, Learner	Student classroom participation	1.00	
Learner	Student time on task	1.00	
Learner	Improved reading/study skills	1.00	
Home environment / peer group	Cooperative learning	0.80	79
Teacher	Homework (graded)	0.80	
Teacher	Classroom morale	0.60	73
Learner	Initial cognitive prerequisites	0.60	
Home environment / peer group	Home environment intervention	0.50	69

Two Approaches Applying Tech. in Education

- Why do we need a rich and highly interactive learning environment for learners?
  - One-on-one tutoring seems to produce a "2-sigma" gain in learning
    - Increased learner **motivation**
    - **Advanced** topics **mastered**
    - **Students acting** as experts
    - **Better outcomes** on standardized test

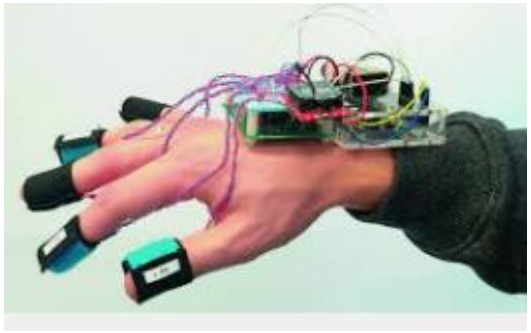
Source: AI & Education, UNESCO, Beijing, 2019

- Technology centered approach
  - AI-Led
- Human centered approach
  - AI-assisted
  - The power of computer-human partnership

Utilizing ICT for Education [1]

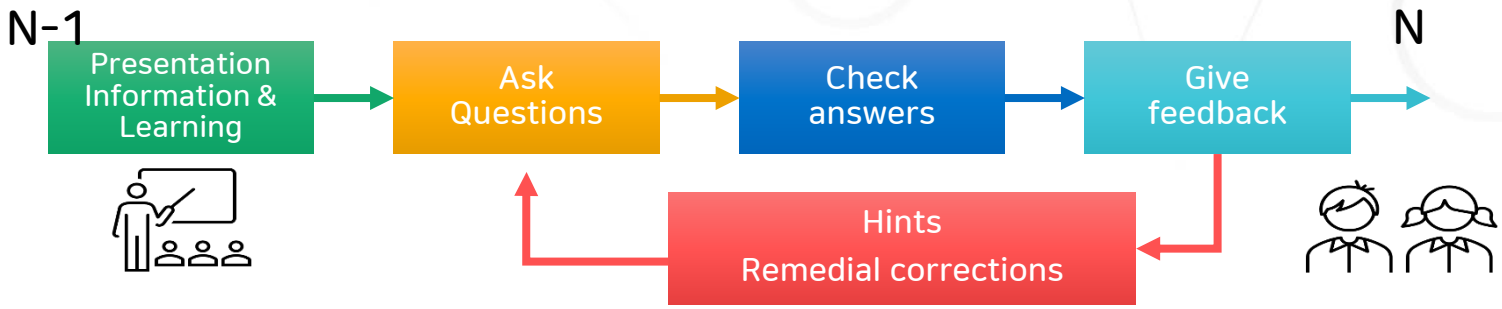
- Computer as a learning Tools
  - Using Internet, contents, learning materials for teaching/learning purpose

- Apply digital contents/toys/gadgets in teaching/learning process
  - Video clips, Ytube movies, real-time teleconferencing
  - PPT materials, OERs, digital images, recorded sound
  - AI speakers, Arduino, Drone, Robots



Utilizing ICT for Education [2]

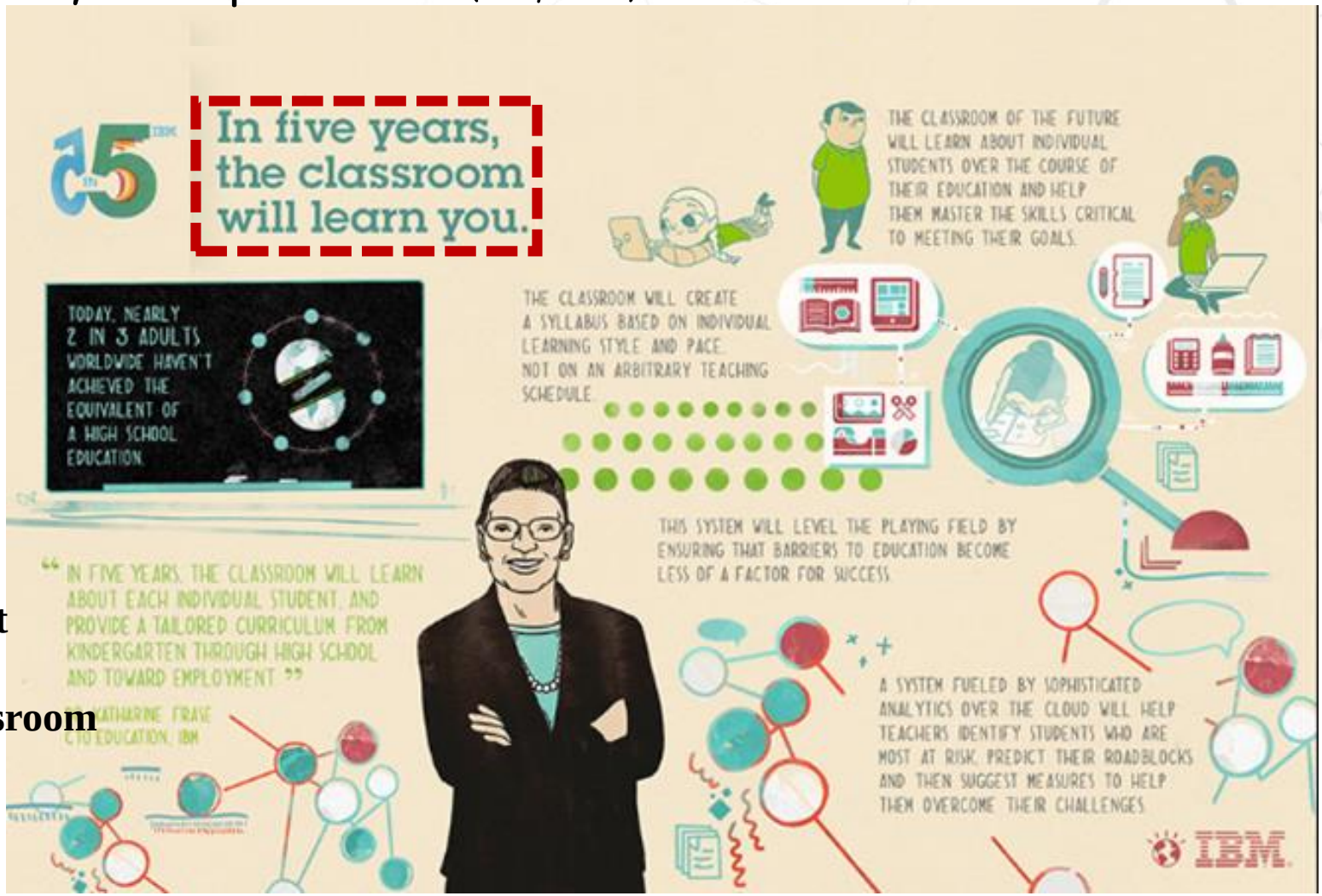
- Computer as a Tutor
  - Intelligent tutoring system (ITS)
    - A computer system
    - Provide immediate and customized instruction or feedback to learners
    - No need of intervention from a human teacher



- Traditional ITS: model based tutoring systems
- AI technology enhanced ITS: machine learning/data based ITS

Predictions and Achievements of AI in Education

- 2013, IBM report 5-in-5 (IBM, 2013)



Know how student does in classroom

Other Trials of AI in Classrooms

- Jill Watson

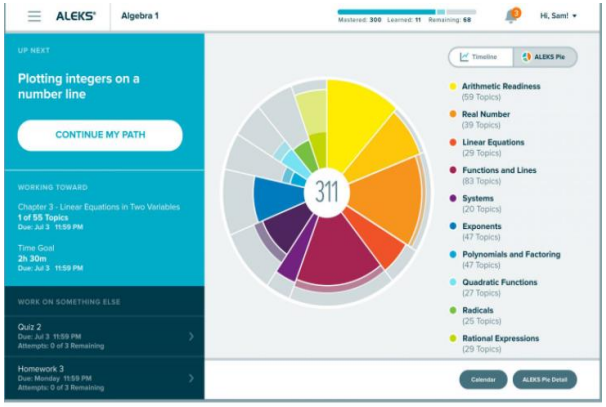
Jill Watson, an AI Pioneer in Education, Turns 4

Fri, 01/24/2020

Related Lin

  - Developed at Georgia Tech in 2016
  - First deployed onto the online discussion forum of a graduate-level CS class
  - Alongside a team of human teaching assistants, Jill answered student questions as they came in
  - At the end of her semester-long debut, students were not able to distinguish which of the TAs was the AI. Four years later, she's still going strong

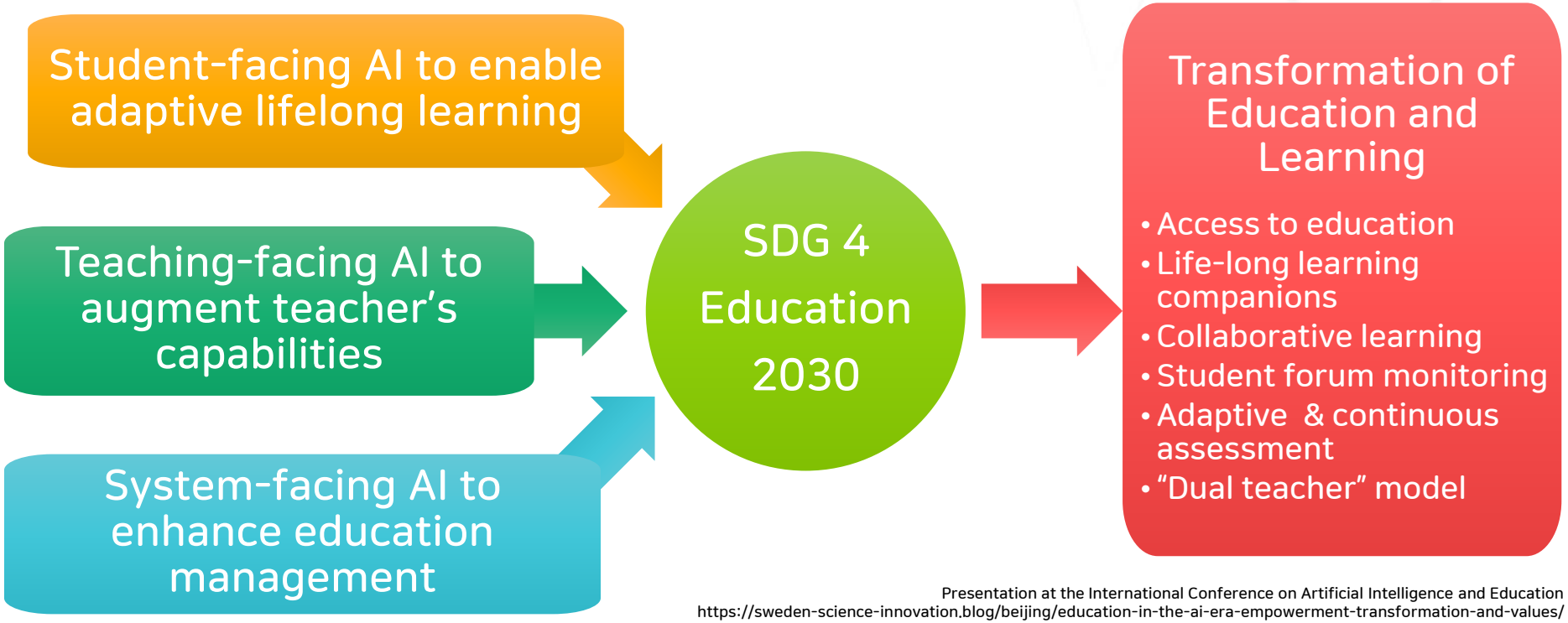
- AI Teacher in classroom
  - A Chinese school is using facial recognition to analyze Students' behavior
  - McGraw Hill's ALEKS



Assist Teachers

The Expected Impact of AI on Education

- Not only in form of technical change, but also in terms of structural and governance change are here and now
- It changes the way of learning and teaching
- The role of teachers and the empowerment of teachers in the AI-era are very important



Presentation at the International Conference on Artificial Intelligence and Education
https://sweden-science-innovation.blog/beijing/education-in-the-ai-era-empowerment-transformation-and-values/

10 Ways of AI Can Reinvent Education

- Artificial intelligence can automate basic activities in education, like grading
- Educational software can be adapted to student needs
- It can point out places where courses need to improve
- Students could get additional support from AI tutors
- It is altering how we find and interact with information
- AI can make trial-and-error learning less intimidating

- AI-driven programs can give students and educators helpful feedback
- Data powered by AI can change how schools find, teach, and support students
- AI may change where students learn, who teaches them, and how they acquire basic skills

(ref. http://www.onlineuniversities.com/blog/2012/10/10-ways-artificial-intelligence-can-reinvent-education/)

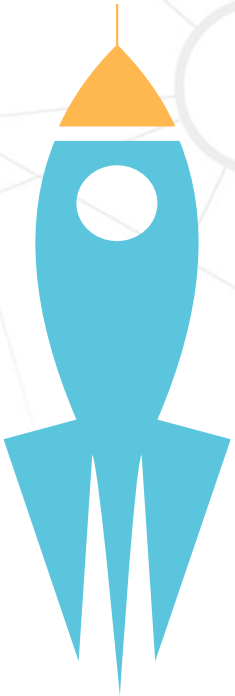
Conclusions

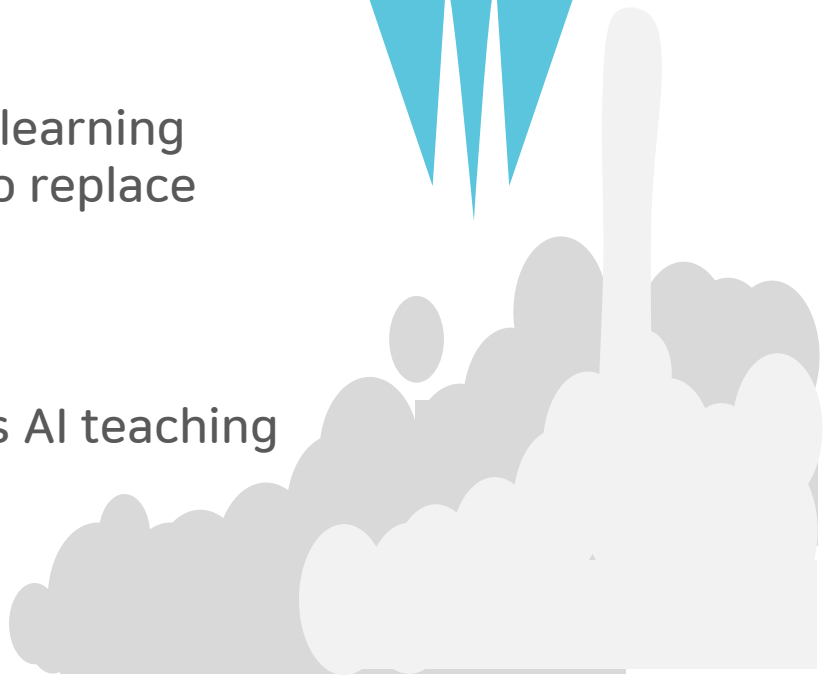
AI may support teachers to be effective facilitators by analyzing student achievement in real-time, but we need to solve several issues to work properly yet

AI powered technologies into classroom teaching will prevailed soon

Adapting new technologies in learning environment does not mean to replace human teachers

We need to empower teachers AI teaching competencies





Thank You!

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