

# Action Research in schools

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# My experience

- **Assistant Professor** of STEM education, CUHK
- **Associate Director**, Centre of School-university Partnership
- **Associate Director**, Centre of learning science and technology
- Member, **Steering Committee on Strategic Development of Information Technology in Education**.
- Judges, various local and international STEM competitions, and teaching awards
- **Top 2 % most-cited scientist in 2021**
- Associate editor, 4 international journals
- Gifted Education Programmes, HKAGE and HKUST
- EDB curriculums committee /HKEAA ICT exam setter
- Consultant, Mathematics textbook, Pearson

# Today

- Why research?
- What is Action Research?
- How to start?
- Where to share?

Research is

Too “theory”

Too off grounded

Annoying...

Nothing to do with me?

Fixed VS Growth mindset

Same VS Change in teaching and learning

# GenAI Schools

Attitude	<ul style="list-style-type: none"><li>• Learn-it-all attitude</li><li>• positive education / growth mindset</li></ul>
Knowledge	<ul style="list-style-type: none"><li>• AI Literacy</li><li>• Critical thinking and reasoning</li><li>• Disciplinary knowledge</li><li>• Questioning skill</li></ul>
Learning outcomes	<ul style="list-style-type: none"><li>• The importance of generic skills</li><li>• New learning outcomes</li></ul>
Teaching	<ul style="list-style-type: none"><li>• Assessment approaches</li><li>• Interdisciplinary teaching</li></ul>

# Benefits

- Evidence-based good practices
- Rigorous method
- Objective measures
- Teacher professional standards
- Local → international recognition
- **Share your achievement**

**Changing Teaching - Changing Learning**

# Types of Scientific Research

- **Categorized by purpose**
  - Basic Research, Applied Research
  - Evaluation Research, Research and Development (R&D)
  - **Action Research**
- **Categorized by method**
  - Quantitative
    - Descriptive research, Correlational research
    - Causal-comparative research, Experimental research, Single-subject research
  - Qualitative
    - Narrative research, Ethnographic research
- **Categorized by time**
  - Cross-sectional research, Longitudinal research



In schools, action research refers to a wide variety of evaluative, investigative, and analytical research methods designed to diagnose problems or weaknesses—whether organizational, academic, or instructional—and help educators develop practical solutions to address them quickly and efficiently

# Area of focus for your Action Research

- involve learning and teaching and should focus on one's own practice
- something within your locus of control
- something you feel passionate about
- something you would like to change or improve

# Qualitative VS Quantitative Research

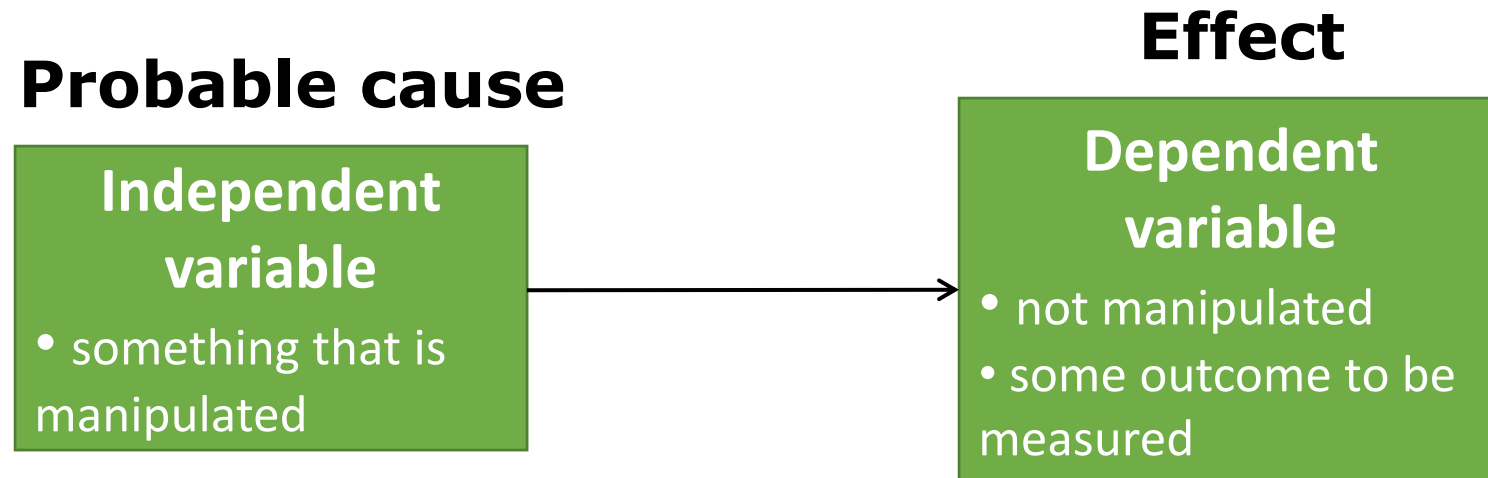
<b>Qualitative</b>	<b>Quantitative</b>
Develops hypotheses	Tests hypotheses
Does not seek to control the contexts	Seeks to control the contexts
Researcher interacts with participants	Researcher does not interact with participants
Involves a smaller sample size	Involves a large number of subjects / participants for results to be statistically significant
Assumes individuality	Assumes that contexts are stable, uniform and controllable
Interpretation of data	Data analyses rely on statistical procedures

# Correlational Research

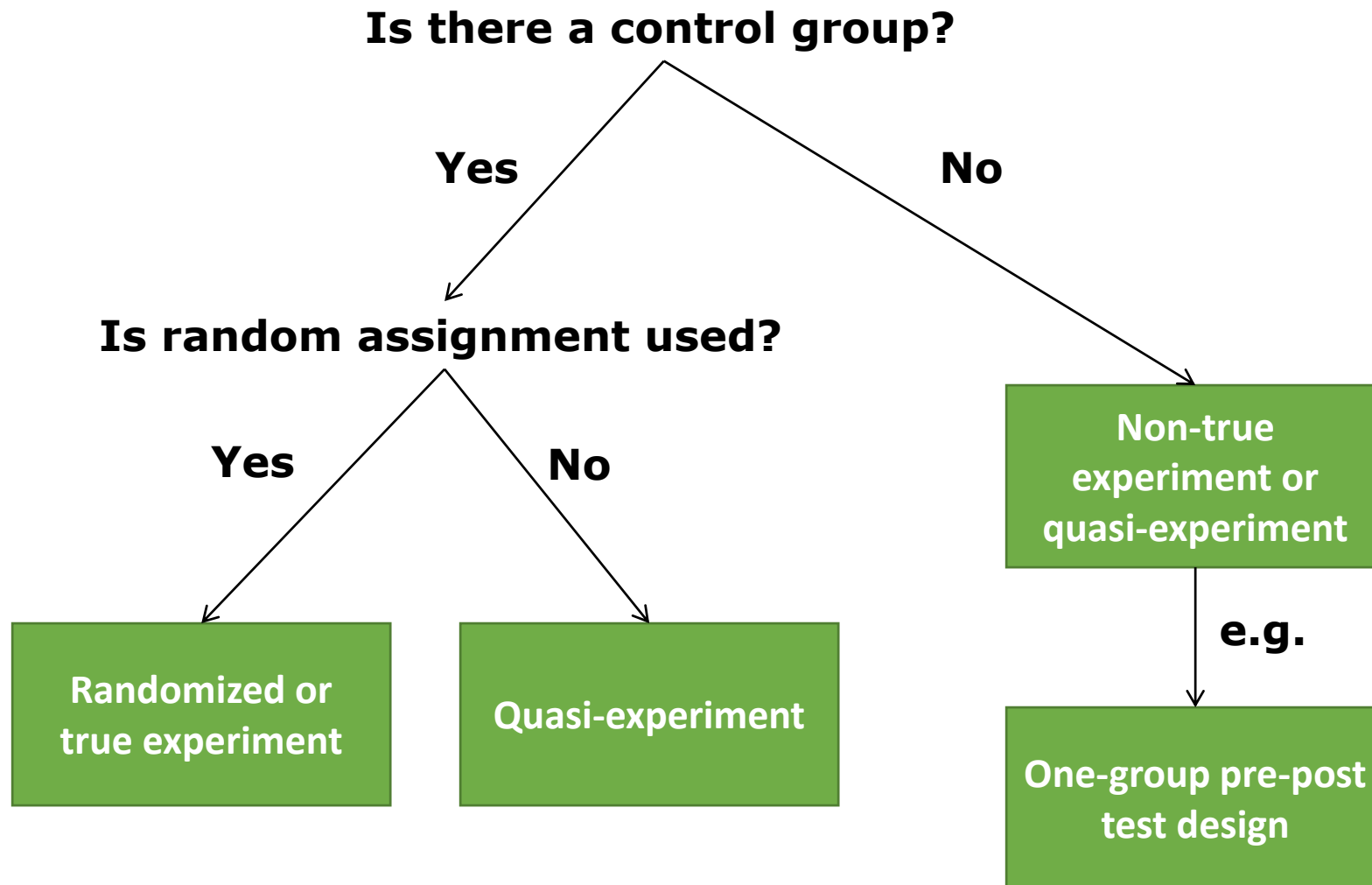
- Correlational research attempts to determine whether and to what extent, a relationship exists between two or more numerical variables
- A researcher uses the correlation coefficient to report the research
- Some examples:
  - The relationship between intelligence and computer use
  - The use of an aptitude test to predict computer use in a science class
  - The use of a mathematic test to predict STEM performance

# Experimental research

- You test an **activity** or **intervention** [independent variable] to see if it affects an **outcome** [dependent variable]



# Experimental research



# Format of Good Research Articles (APA7)

- Abstract
- Introduction
  - Your motivation / local / international issues
- Literature Review
  - Definition of terms
  - Related studies
- This study and method
  - Research questions
  - Methods
  - Materials, procedure
- Results / Findings
- Discussion (Significance of the study - how might the inquiry improve my teaching)
- References

# Steps to do Action Research

1. Identify issues
2. Look for ideas (literature)
3. Identify the Research Question
4. Research action plan
5. Collect and analyze data
6. Discussions and suggestions



# Example 1a (experimental)

Step	Action
Identify issues	Not sure if creativity writing is effective
Look for ideas (literature)	Reading papers / EDB suggestions  What do previous studies tell?

# Example 1b (experimental)

Step	Action
Identify the Research Question	RQ1: Does sensory language improve creative use of English? RQ2: Does sensory language enhance learning interest? RQ3: How does sensory language improve the learning?
Research action plan	Learning: Creating worksheet RQ1: Pre-test and post-test RQ2: Questionnaire RQ3: Interview & learning journal

# Example 1c (experimental)

Step	Action
Collect and analyze data	<ul style="list-style-type: none"><li>• Examine a non-sensory language (business as usual) teaching</li><li>• Followed by sensory language instruction</li><li>• 1 week learning period</li><li>• Pre-test and post-test (improvement)</li><li>• Post-questionnaire</li><li>• Interview (Sampling)</li><li>• T-tests</li></ul>
Discussions and	The key messages to readers (leaders, schools) Try to explain your case by comparing your results to

# Example 2a (experimental)

Step	Action
Identify issues	Is LMS good for self-regulated learning?
Look for ideas (literature)	How to design LMS?  What do previous studies tell? What is self-regulated learning? (five steps) What is gamification?

# Example 2b (experimental)

Step	Action
Identify the Research Question	RQ1: Does gamification improve self-regulated learning? RQ2: Does gamification improve student engagement? RQ3: How do games improve the self-regulated learning?
Research action plan	Learning: creating games using wordwalls RQ1 & RQ2: Questionnaire / observation RQ3: Use five steps of self-regulated learning to interview <b>What is student engagement?</b>

# Example 2c (experimental)

Step	Action
Collect and analyze data	<ul style="list-style-type: none"><li>• Design two LMS (e.g., google classrooms)</li><li>• 1 week self-regulated learning period</li><li>• Pre and post-questionnaire</li><li>• Observation form</li><li>• Interview (Sampling)</li><li>• T-tests</li></ul>
Discussions and suggestions	<p>The key messages to readers (leaders, schools)</p> <p>Try to explain your case by comparing your results to existing literature</p>



# Example 3b (whole school)

Step	Action
Identify the Research Question	RQ1: Does growth mindset based feedback motivate students with different learning abilities? RQ2: How does the feedback enhance student motivation?
Research action plan	Sampling – 2 classes in each form (high and low performance) Create feedback sheet Workshops for all the teachers RQ1: Questionnaire / observation RQ2: Interview / video



# Example 3c (whole school)

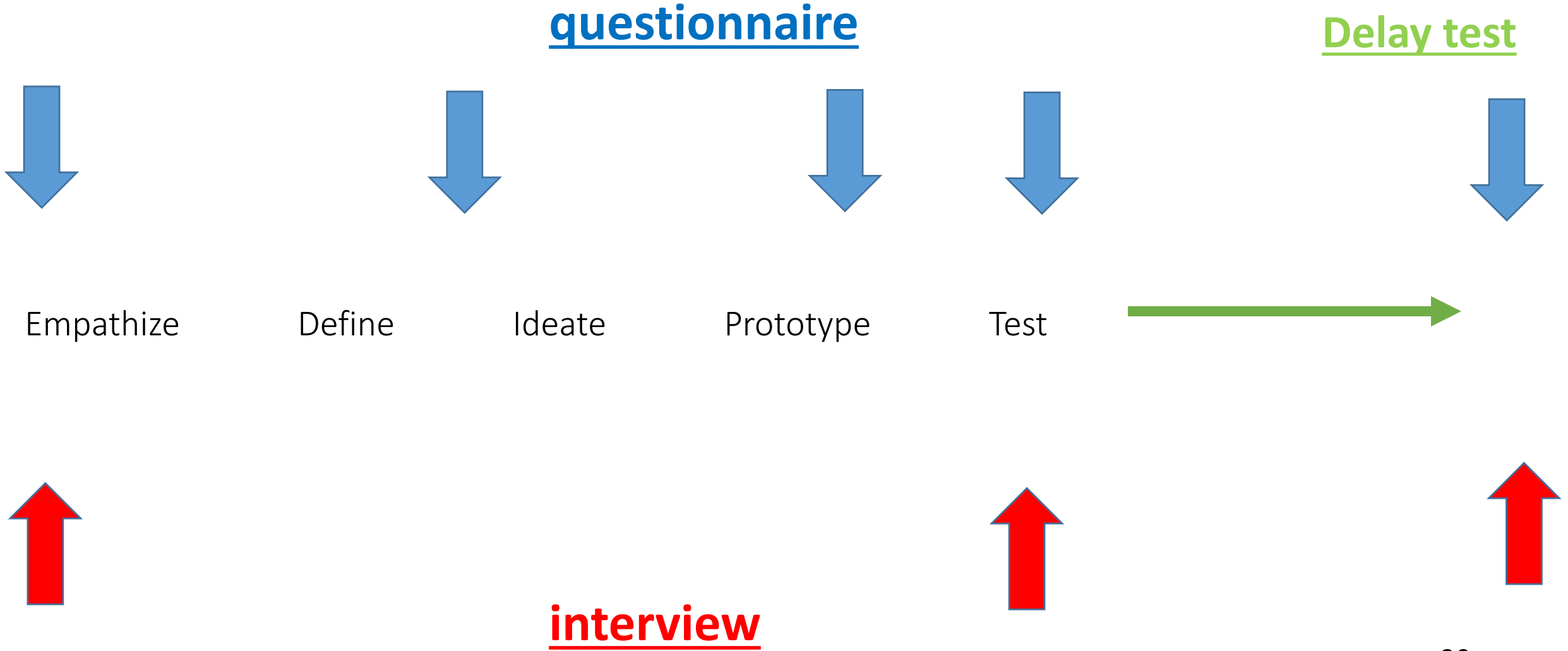
Step	Action
Collect and analyze data	<ul style="list-style-type: none"><li>• Video record classroom teaching</li><li>• Pre and post-questionnaire</li><li>• Observation form</li><li>• Interview (Sampling – gender, learning performance and etc)</li></ul>
Discussions and suggestions	<p>The key messages to readers (leaders, schools)</p> <p>Try to explain your case by comparing your results to existing literature.</p>

# Example 4a (longitudinal study)

Step	Action
Identify issues	The impact of project-based learning
Look for ideas (literature)	What is project-based learning?  How long ? When to do it?

# Example 4b (longitudinal study)

Step	Action
Identify the Research Question	RQ1: Does design thinking improve creativity, communication and collaborative skills ? RQ2: How does the design thinking enhance the three skills?
Research action plan	Sampling – form 1 Period (6 months) Create work sheet using design thinking Workshops for all the teachers RQ1: Questionnaire / observation / presentation (at 6 points)



# Example 4c (longitudinal study)

Step	Action
Collect and analyze data	<ul style="list-style-type: none"><li>• Worksheet</li><li>• Student presentation</li><li>• Pre and post-questionnaire</li><li>• Observation form</li><li>• Interview</li></ul>
Discussions and suggestions	<p>The key messages to readers (leaders, schools)</p> <p>Try to explain your case by comparing your results to existing literature.</p>

# Framing research questions (souls)

- It takes time
- It may involve a lot of exploration through wonderings
- The research cycle **continues** with new question as well as possible answers

**Reading, sharing and attending seminars are the key!!**

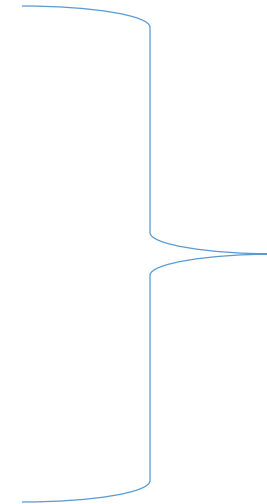
Tip: Don't rush to state a question so your research can begin. Figuring out the question is an important part of the research.

# How to find and read journal papers

- Let's look at how we read the following two papers
- **Chiu, T. K. F.**, Moorhouse, B. L., Chai, C. S, & Ismailov M. (2023). Teacher support and student motivation to learn with Artificial Intelligence (AI) chatbot, *Interactive Learning Environments, Advanced online publication*, <https://doi.org/10.1080/10494820.2023.2172044> (IF: 4.97 / Q1)
- **Chiu, T. K. F.** (2022). School learning support for teacher technology integration from a Self-Determination Theory perspective. *Educational Technology Research and Development. Advanced online publication*, <https://doi.org/10.1007/s11423-022-10096-x> (IF: 5.58 / Q1)
- Google Scholar is good, but.... Try this one.
- <https://www.scimagojr.com/journalrank.php>

# Where to start

- Get to know some journals
- Get new teaching ideas
- Try the ideas in your classrooms
- Go to some local conferences
- Get feedback
- Revise and submit a full paper to local / international conferences and an international journal



Work with  
some  
experienced  
researchers



# Conferences and Journal – Practitioners' track

- 全球華人計算機教育應用大會 ( Global Chinese Conference on Computers in Education , GCCCE )
- International Conference on Learning and Teaching (ICLT), The Education University of Hong Kong, Hong Kong

# Topics

- Self-regulated learning
- AI in education
- Positive education
- Digital learning
- Formative assessment
- Interest and identity (Science)
- Interdisciplinary teaching

Learning and Teaching is evolving

How about YOU?

# Thank You

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