

PDEV6800Y:

Introduction to Teaching and Learning in Higher Education



What is PDEV 6800?

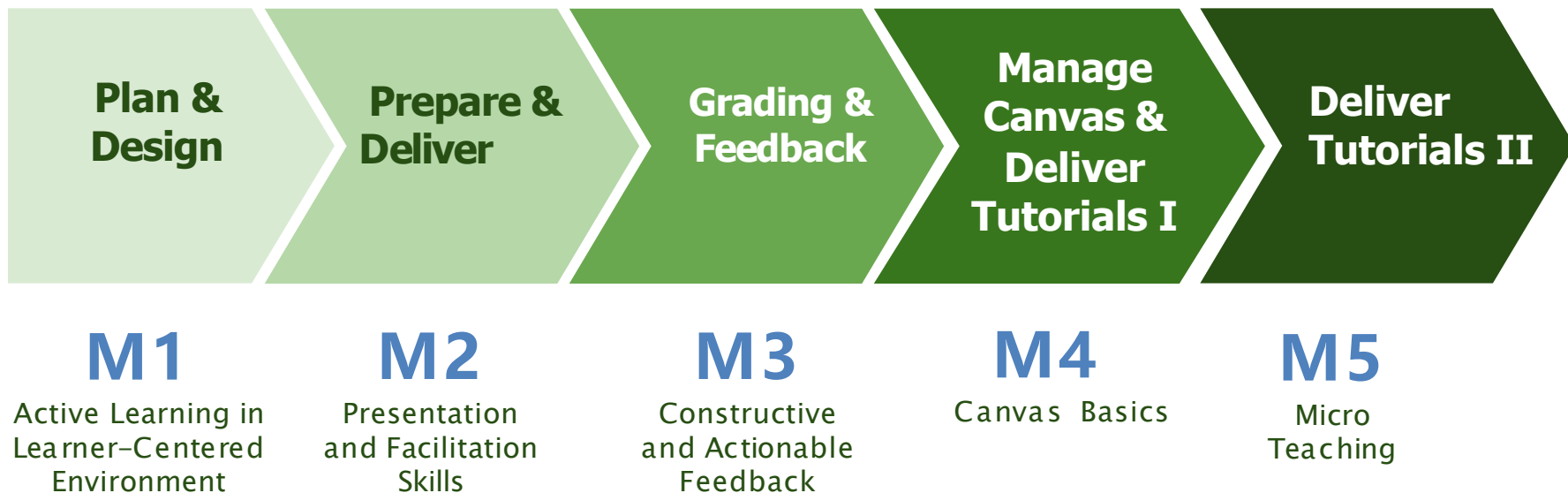
- Introduction to Teaching and Learning in Higher Education
- Enhance RPs' teaching effectiveness and professionalism
- Two parts
 - PDEV 6800 Y: 10-hour theoretical knowledge and skills training by IEIP
 - PDEV 6800 K-N & S: teaching assignment managed by Hub/Thrust/RBM

What is PDEV 6800?

Intended Learning Outcomes (ILOs)

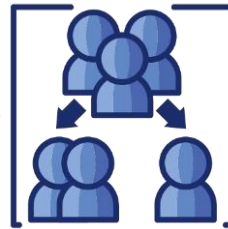
- Identify **fundamental theories** and **good practices** in teaching and learning
- Design appropriate **active learning activities** to engage students
- Apply constructive alignment in **designing learning sequences**
- Demonstrate **teaching and facilitation skills** in different teaching settings
- Formulate **constructive feedback** to assist students as they progress in their learning

How can 6800 help your upcoming GTA duty?



Micro-teaching (MT)

Lesson Plan				
TOPIC		Practical Programming language with C++		
INTENDED LEARNING OUTCOMES (ILOs)		1) Students will be able to apply C++ programming languages 2) Students will be able to apply problem solving skills by prototyping and debugging various C++ programs.		
MATERIALS NEEDED		1) Application: Dev C++ 2) Helping material: In-Class Power point slides, textbook, Lectures, tutorials and printed Quiz 3) Most required: Desktop pc, Laptop		
BUT FIRST!	TIME	PURPOSE why?	LEARNING CONTENTS what to cover?	LEARNING ACTIVITIES (AL) how to do it?
How will you engage your students? (what activities?)	4 min	To check students' understanding about programming language	<ul style="list-style-type: none"> Overview of C++ Basic history of C++ and applications How the language is organized. 	<ul style="list-style-type: none"> Take a quiz on-line to check their prior knowledge One Minute Paper on students' response to open questions What is the most important thing you learned? Summarize today's lecture in one sentence What questions remain?
What is your first topic? How and you elaborate the topic?	10 min	To explain the setup, style & C++ operators	<ul style="list-style-type: none"> Programming style How to comment on a program How to write clear and simple code Simple C++ statements Basic variables and the assignment statement; The arithmetic operators: +, -, *, / and % The shorthand operators ++, --, *=, /=, %=, +=, -=, /= and %= 	In-class Demonstration <ul style="list-style-type: none"> To demonstrate the application of a concept. Students should be involved in the demonstration, and be required to reflect and analyse the process. Have students predict the outcome/output of the demonstrations/program individually, and then have them discuss it in groups, or with the whole class. In-class demonstrations are valuable
How would you assess your students' learning? (what are the activities before students exit session and explain their answers?)	10 min	To check students' understanding on the programming language which have just been demonstrated	<ul style="list-style-type: none"> Programming style How to comment on a program How to write clear and simple code Simple C++ statements Basic variables and the assignment statement; The arithmetic operators: +, -, *, / and % The shorthand operators ++, --, *=, /=, %=, +=, -=, /= and %= 	Practice Session <ul style="list-style-type: none"> 10 MC Questions to test students understanding on how to use C++ programming language in solving different problems
How would you deliver? (can you elaborate further on students' understanding?)	5 min	To summarise how to use C++	Same as above	Correct answers and outputs will be demonstrated and explained by the instructor
What is your final evaluation?	10 min	To reflect how to apply C++ in daily computational problem solving	<ul style="list-style-type: none"> Simple decision statements including if, else and for Three steps required for creating a simple program, from specification through release Fast prototyping, and debugging 	Think-pair-check <ul style="list-style-type: none"> Students think about a particular question individually. Students then pair to discuss their answers Following this, the results are shared in a large classroom discussion



Micro-teaching: Lesson Plan Feedback Sheet

Criteria		Excellent (E)	Competent (C)	Developing (D)
Lesson Plan	Course Information and Rundown	The lesson plan included all the necessary information about the course and the topic to teach. The rundown is clear with explicitly defined purposes; what to cover; and how to cover for each time session.	The lesson plan included some information about the course and the topic to teach. The rundown is somewhat clear with purposes; what to cover; and how to cover for each time session.	The lesson plan lacked information about the course and the topic to teach. The rundown is unclear about the purposes; what to cover; and how to cover for each time session.
	Intended Learning Outcomes (ILOs)	The lesson plan included one or more well-articulated learning outcome(s) that followed the ABCD model with a clear structure of behavior, condition, and degree.	The lesson plan included at least one clear learning outcome that somewhat followed the ABCD model with the structure of behavior, condition, and degree.	The lesson plan included a vague learning outcome that doesn't follow the ABCD model.
	Active Learning Strategies (ALS)	The lesson plan integrated more than two active learning strategies throughout the lesson. All the ALS are suitable to achieve the ILOs.	The lesson plan integrated two active learning strategies throughout the lesson. All the ALS are suitable to achieve the ILOs.	The lesson plan integrated two active learning strategies throughout the lesson, but the ALS are not suitable to achieve the ILOs.
	Constructive Alignment	The learning outcomes, learning activities, and learning assessment are constructively aligned for the 50-min tutorial.	The learning outcomes, learning activities, and learning assessment are somewhat aligned for the 50-min tutorial.	The learning outcomes, learning activities, and learning assessment are not aligned for the 50-min tutorial.

Lesson Plan

Teaching Demo

Peer Review

Housekeeping

To pass



- Submit all 4 pre-class challenges (M4-Canvas Basics Module has special arrangement) on Canvas on time
- Attend all 5 in-class sessions
- Complete a final 10~15-min Micro-Teaching(MT) tutorial



To grow
(beyond 6800)



- Get ready to be a GTA
- Sharpen transferrable skills
- Become a better learner & teacher



Module Challenges on Canvas

the published version of the quiz

10:10am

Instructions

Question 1

1 pts

This concept refers to the set of steps or actions that needs to be prepared to make things easier.

- ☐ Engagement
- ☐ Facilitation
- ☐ Presentation
- ☐ Procedural

Question 2

Which of the following is not a component of the 5E model?

ement

1. Get $\geq 60\%$ score of Module Challenges on Canvas
2. **Due** dates: check on Canvas

Recall your past study experience

- Have you ever participated in a tutorial?
- What types of tutorial have you participated in?
- What does a tutorial do?
- What a student shouldn't be doing in tutorials



Types of Tutorial

1. Discussion-based

- A deeper exploration of course content through discussions and debates

2. Problem-solving

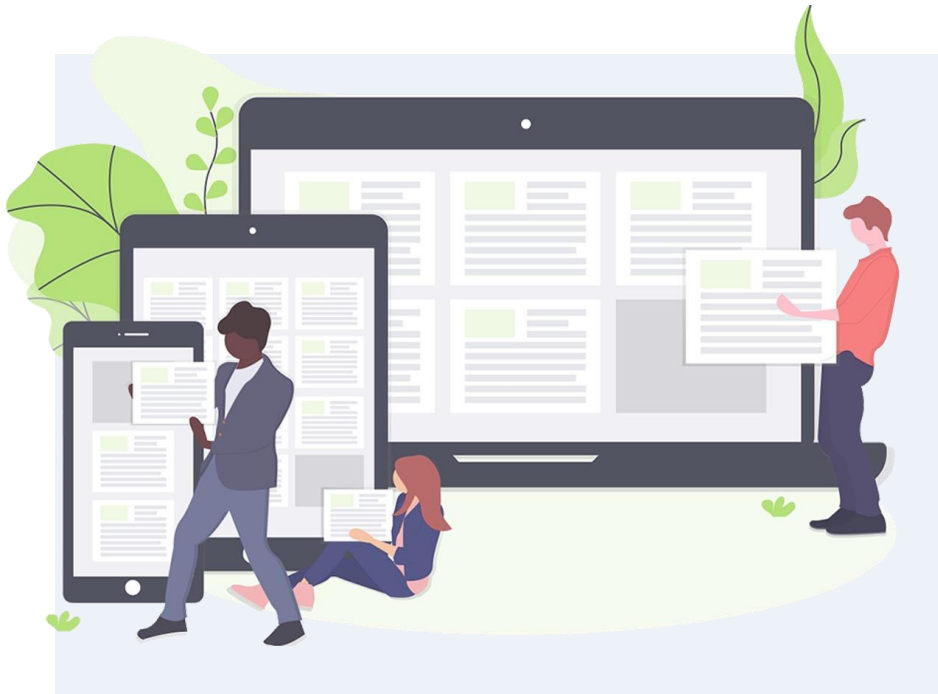
- Quantitative problem solving and reasoning, common in STEM

3. Review and Q&A

- Preparation for tests or exams in which the tutor reviews or ask questions on the course content



What does a tutorial do?



- Practice the lecture content
- Clarify the lecture content
- Know students' progress
- Allow students to ask Qs
- Find out the problems students encounter
- **Provide feedbacks**

What a student shouldn't be doing in tutorials?

Don't

- ✗ Listen passively
- ✗ Copy down the tutor's teaching or notes
- ✗ Pretend that they understand



Your Help in PDEV 6800Y

Instructor:

Dr. LI, Ran

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Office Hour: Fri. 10:00-
12:00, E1-316

Teaching Assistant:

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zyang979@connect.hkust-gz.edu.cn

Q & A



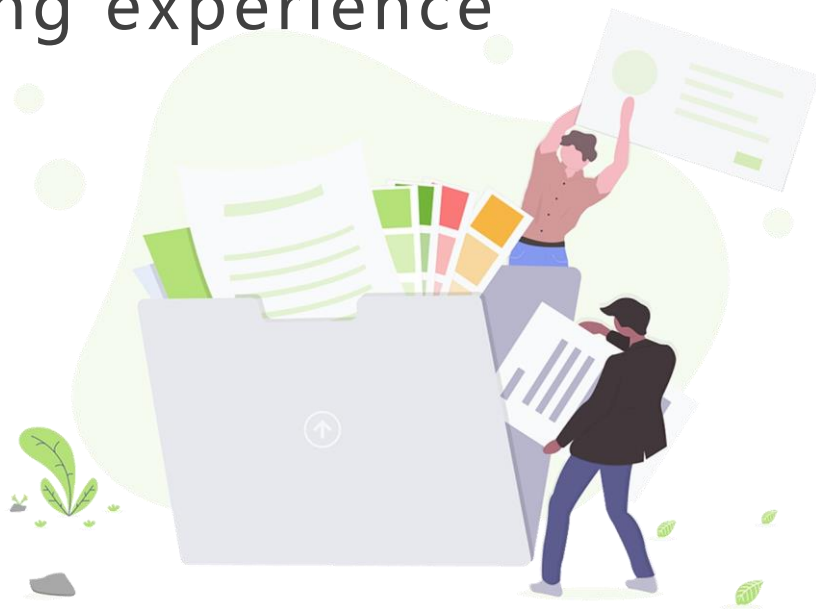
Module 1

Active Learning in Student- Centered Classroom



AL Activity: Writing (Minute Paper)

Reflect on your own learning experience



Open Question

Points: 0

 Setting

What is your most impressive learning experience? (2 min)

- What motivates you?
- Who taught you?
- What did you learn?
- How did you learn?
- Have you ever failed?
- What would you do differently if you had the second chance to learn it?

Answer

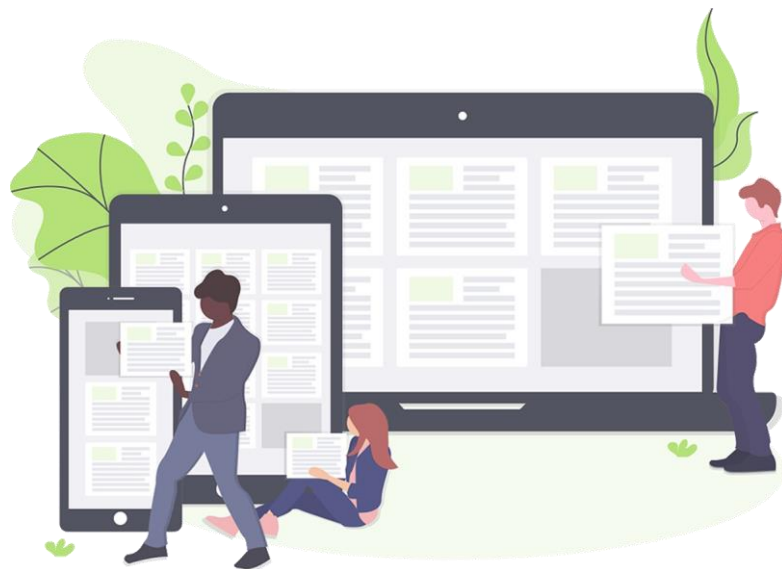
AL Activity: Think-Pair-Sharing(3 min)

Common Vs. Unique



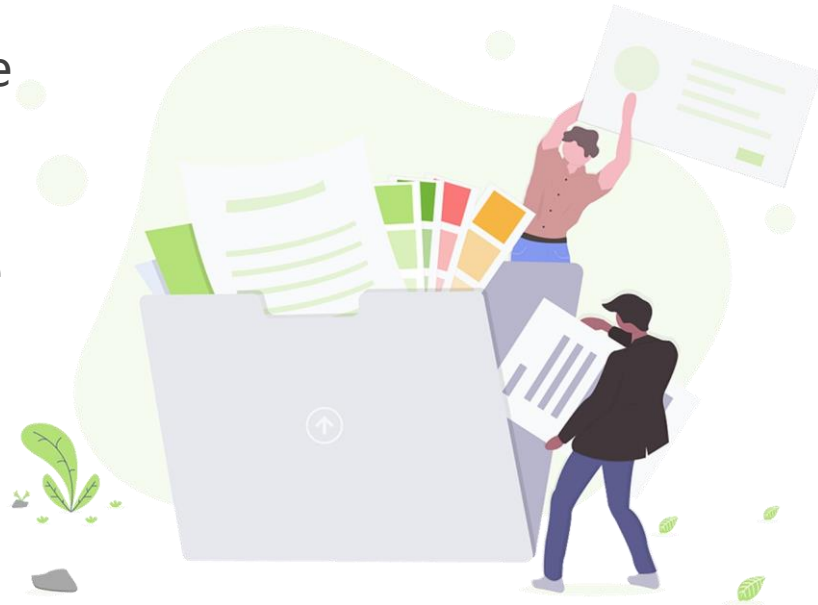
How do we learn better?

- Practice
- Interest/Passion
- Good teacher
- Persistence
- Motivation (intrinsic/extrinsic)
- Peers support
- Failure
- Sense of achievement



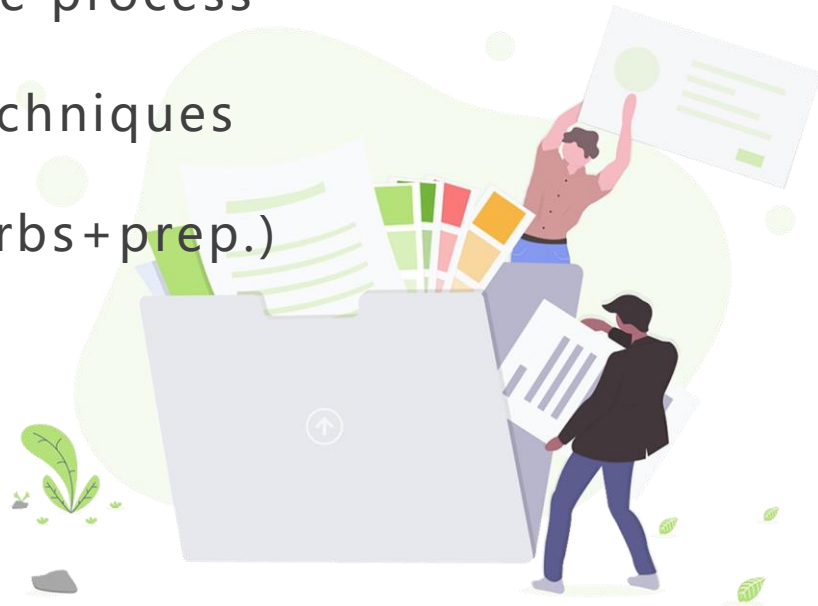
Forming your group

- Stand up and move around. Form a group of **5 to 6**
- Sit around a table and Identify the table(group) number
- Get to know each other, exchange contacts



An Outcome-Based, Learner-(Growth)Centered Framework

- Intended Learning Outcomes(**ILO**)
- **Bloom' s Taxonomy** for cognitive process
- Active Learning (**AL**) Strategies/Techniques
- Constructive Alignment(nouns+verbs+prep.)
- **ABCD** Method



Outcome-Based Education (OBE)

A Learner-Centered Framework

“Learning outcomes are statements of what students CAN DO as a result of a learning experience.”



Aim at Metacognition

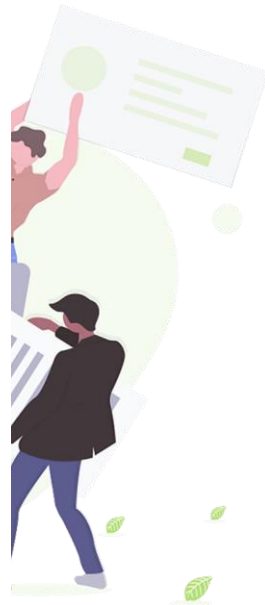
The Knowledge Dimension classifies four types of knowledge that learners may be expected to acquire or construct—ranging from concrete to abstract (Table 1).

Table 1. The Knowledge Dimension – major types and subtypes

concrete knowledge		abstract knowledge	
factual	conceptual	procedural	metacognitive*
knowledge of terminology knowledge of specific details and elements	knowledge of classifications and categories knowledge of principles and generalizations knowledge of theories, models, and structures	knowledge of subject-specific skills and algorithms knowledge of subject-specific techniques and methods knowledge of criteria for determining when to use appropriate procedures	strategic knowledge knowledge about cognitive tasks, including appropriate contextual and conditional knowledge self-knowledge

(Table 1 adapted from Anderson and Krathwohl, 2001, p. 46.)

*Metacognitive knowledge is a special case. In this model, “metacognitive knowledge is knowledge of [one’s own] cognition and about oneself in relation to various subject matters . . .” (Anderson and Krathwohl, 2001, p. 44).

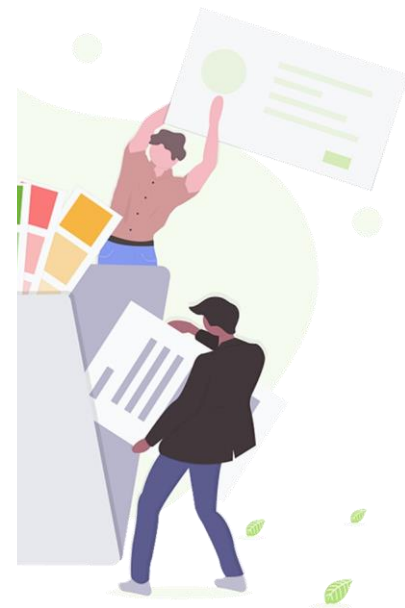


Match Higher order thinking skills

The Cognitive Process Dimension represents a continuum of increasing cognitive complexity—from lower order thinking skills to higher order thinking skills. Anderson and Krathwohl (2001) identify nineteen specific cognitive processes that further clarify the scope of the six categories (Table 2).

Table 2. The Cognitive Processes dimension — categories & cognitive processes and alternative names

lower order thinking skills			higher order thinking skills		
remember	understand	apply	analyze	evaluate	create
recognizing <ul style="list-style-type: none"> identifying recalling <ul style="list-style-type: none"> retrieving 	interpreting <ul style="list-style-type: none"> clarifying paraphrasing representing translating exemplifying <ul style="list-style-type: none"> illustrating instantiating classifying <ul style="list-style-type: none"> categorizing subsuming summarizing <ul style="list-style-type: none"> abstracting generalizing inferring <ul style="list-style-type: none"> concluding extrapolating interpolating predicting comparing <ul style="list-style-type: none"> contrasting mapping matching explaining <ul style="list-style-type: none"> constructing models 	executing <ul style="list-style-type: none"> carrying out implementing <ul style="list-style-type: none"> using 	differentiating <ul style="list-style-type: none"> discriminating distinguishing focusing selecting organizing <ul style="list-style-type: none"> finding coherence integrating outlining parsing structuring attributing <ul style="list-style-type: none"> deconstructing 	checking <ul style="list-style-type: none"> coordinating detecting monitoring testing critiquing <ul style="list-style-type: none"> judging 	generating <ul style="list-style-type: none"> hypothesizing planning <ul style="list-style-type: none"> designing producing <ul style="list-style-type: none"> constructing



Verb(cognitive) + Object(knowledge)

A statement of a **learning objective** contains a **verb** (an action) and an **object** (usually a noun).

- The **verb** generally refers to [actions associated with] the intended **cognitive process**.
- The **object** generally describes the **knowledge** students are expected to acquire or construct. (Anderson and Krathwohl, 2001, pp. 4-5)

In this model, each of the colored blocks shows an example of a learning objective that generally corresponds with each of the various combinations of the cognitive process and knowledge dimensions.

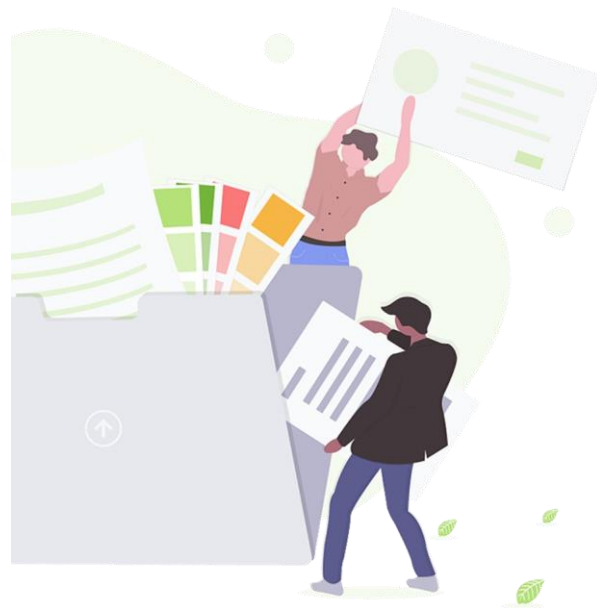
Remember: these are **learning objectives**—not learning *activities*. It may be useful to think of preceding each objective with something like: "Students will be able to ..."

*Anderson, L.W. (Ed.), Krathwohl, D.R. (Ed.), Airasian, P.W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J., & Wittrock, M.C. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives* (Complete edition). New York: Longman.

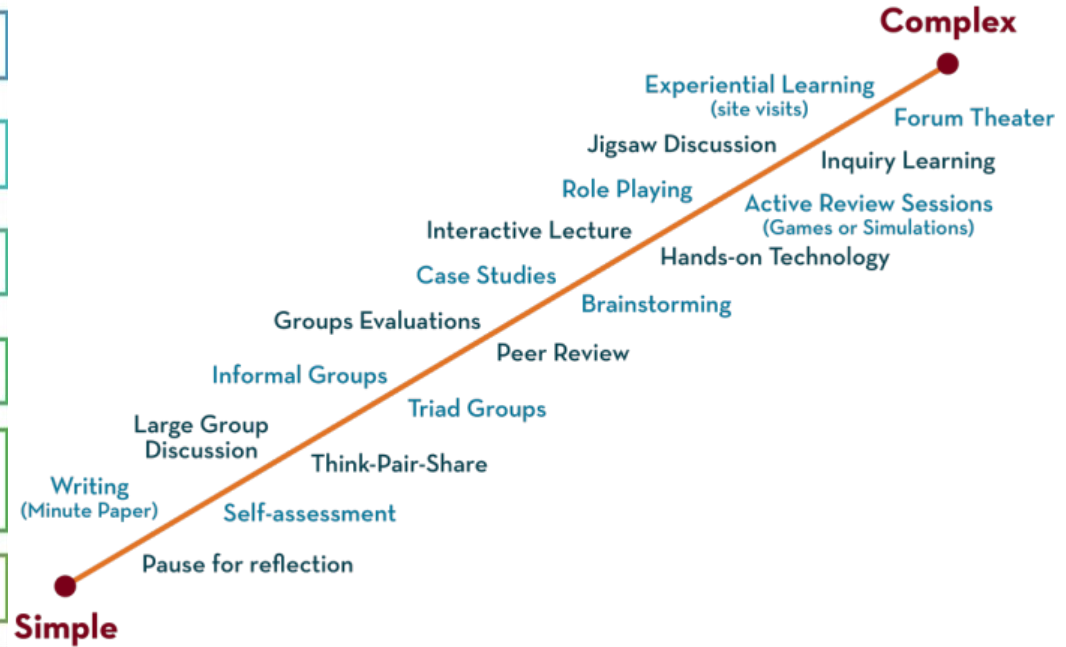
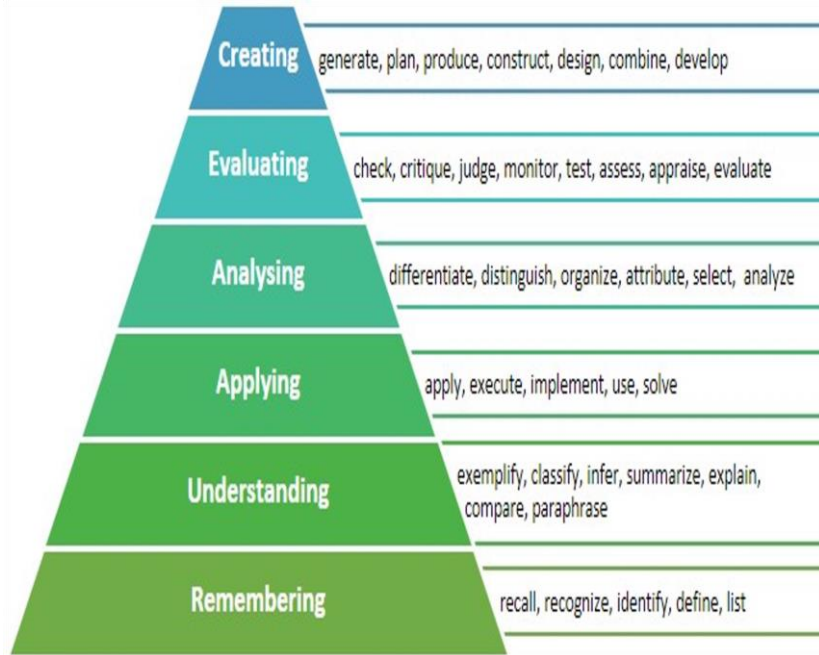


Model created by: Rex Heer
Iowa State University
Center for Excellence in Learning and Teaching
Updated January, 2012
Licensed under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.
For additional resources, see:
www.celt.iastate.edu/teaching/RevisedBlooms1.html

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Aligned with AL techniques



This spectrum arrange active learning techniques by complexity and classroom time commitment (O’Neal and Pinder-Grover, 2023).

AL Activity: Jigsaw Think-Pair-Share

Reflection on your future Practices of AL techniques

- **Separate** the group into 3 pairs
- Each pair **reflects** on one part of active learning techniques (low, medium, high)
- **Read** through each item and make your choice in individual
- **Check** your answer with your pair
- **Share** your reflections with other pairs in group



Constructive alignment

Plan and design activities and materials to achieve the key deliverables



Identify the key deliverables of the tutorial: what students can do by the end of the class

Academic Tutorial
Learning Experience



Deliver the tutorial content and evaluate if the key deliverables are achieved



GUIDE TO WRITE A GOOD LEARNING OUTCOME ABCD METHOD

A

WHO is the target audience?



Describe the intended learner of the instruction

B

WHAT to accomplish?



Use action words to describe observable/measurable learner capability

C

WHAT are the constraints to perform the task?



State the tools, time, and context that learners will be utilized in the behaviour

D

HOW will the behaviour need to be performed?



State the standard for acceptable performance

My **students** will be able to

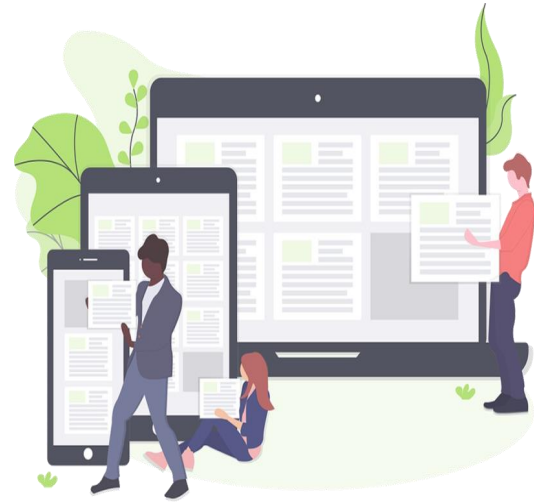
compute the missing value of x

using **quadratic equation**

with 80% **accuracy**.

ILOs by ABCD method

- **W ho** is the intended learner? **(actor)**
- **W hat** the student is expected to do ?**(behavior)**
- **How** the student will be able to perform?
(condition)
- **Which** level of achievement the student is expected to reach? **(degree)**



Example (tutorial level):

- ENVR 2310 students will be able to conduct a cost-benefit analysis on an existing environmental issue/policy by using the economic model taught this week, outlining social, economic and environmental costs and benefits.

Example (tutorial level):

- Students from MATH 1012 will be able to draw graphs of basic functions including linear and square functions in an X-Y coordinate plane correctly.

M1
AL4

AL Activity: Group Work

Write at least two ILOs



Write Your Learning Outcomes



Each group choose a course at HKUST-GZ suitable for AL in a learner-centered classroom



Write the learning outcome based on the ABCD method in individual



Peer review each other's learning outcome in your group



Share the best one with the whole class

How to implement what we learned from this course at HKUST-GZ?

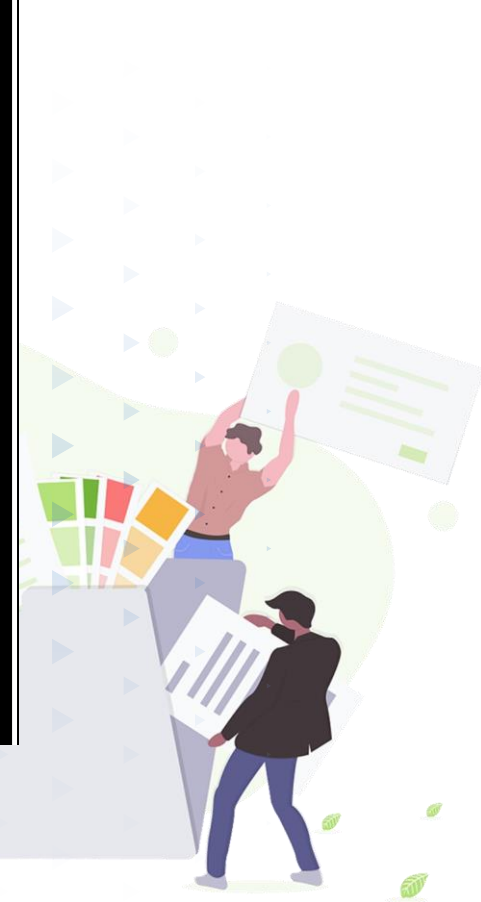


在港科广重构教与学

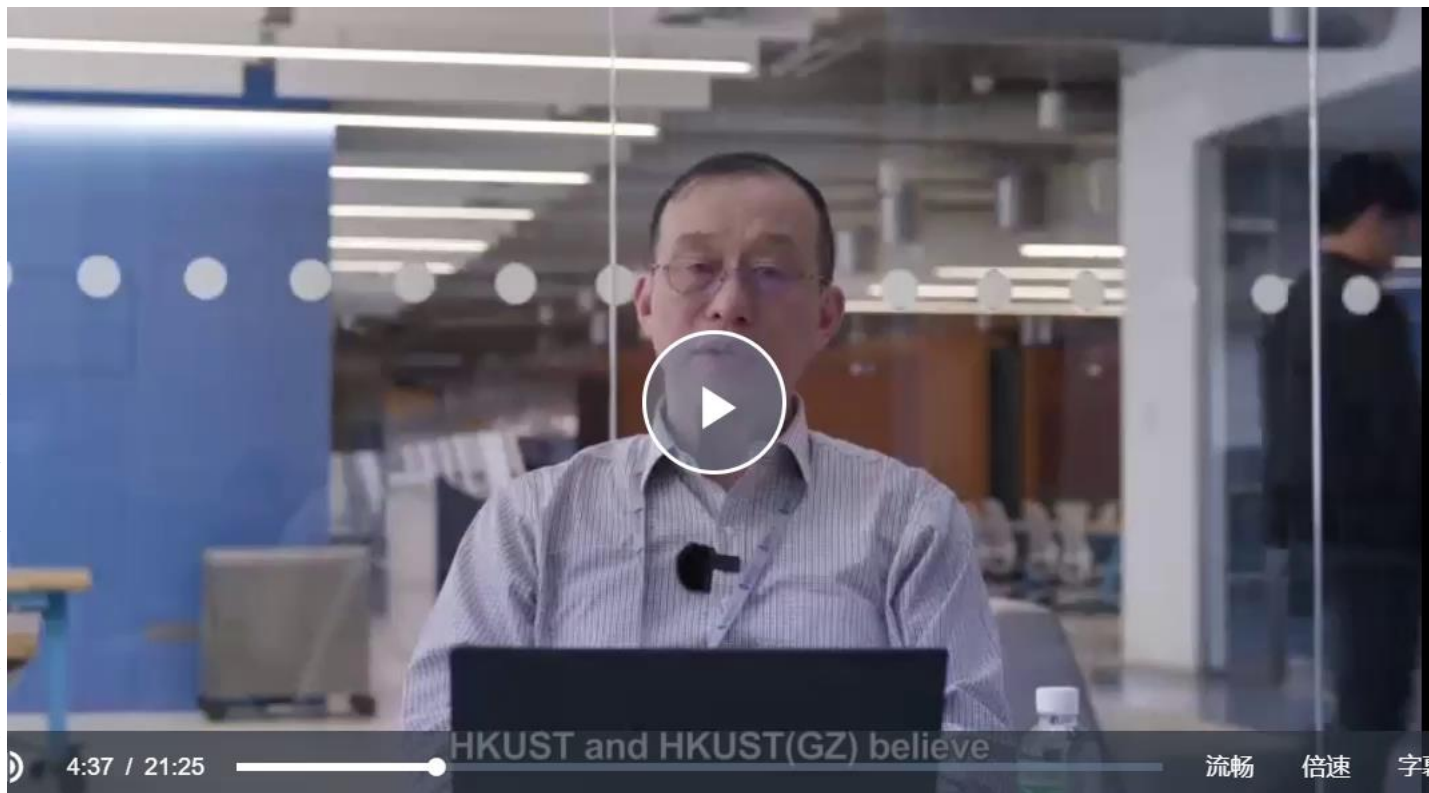
Transformative Education and Learning @ HKUST(GZ)



Teaching Philosophy at HKUST-GZ



Transferrable skills



After-class task



- Form your group on Canvas(more instruction will be provided through email)
- Start identifying a course you are interested in
- Develop the tutorial ILOs by the ABCD method (more details will be provided in the following sessions)
- Refine your tutorial design to better fit the A-HERO vision at HKUST-GZ

Q & A

