

Enhancing Teaching and Learning via Variation

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Variation Theory (變易理論)



Ference Marton

Marton, F., & Booth, S. (1997). *Learning and Awareness*. New Jersey: Lawrence Erlbaum Associates.

Variation Theory



What to learn ?

- Learning is always directed to something (the object of learning, OL, 學習內容).
- Learning is changing the way of seeing the OL in a new and meaningful way.
- Each OL bears many features and some are critical to certain students (necessary but missing in students' minds, CF=critical features, 關鍵特徵) (Japanese).

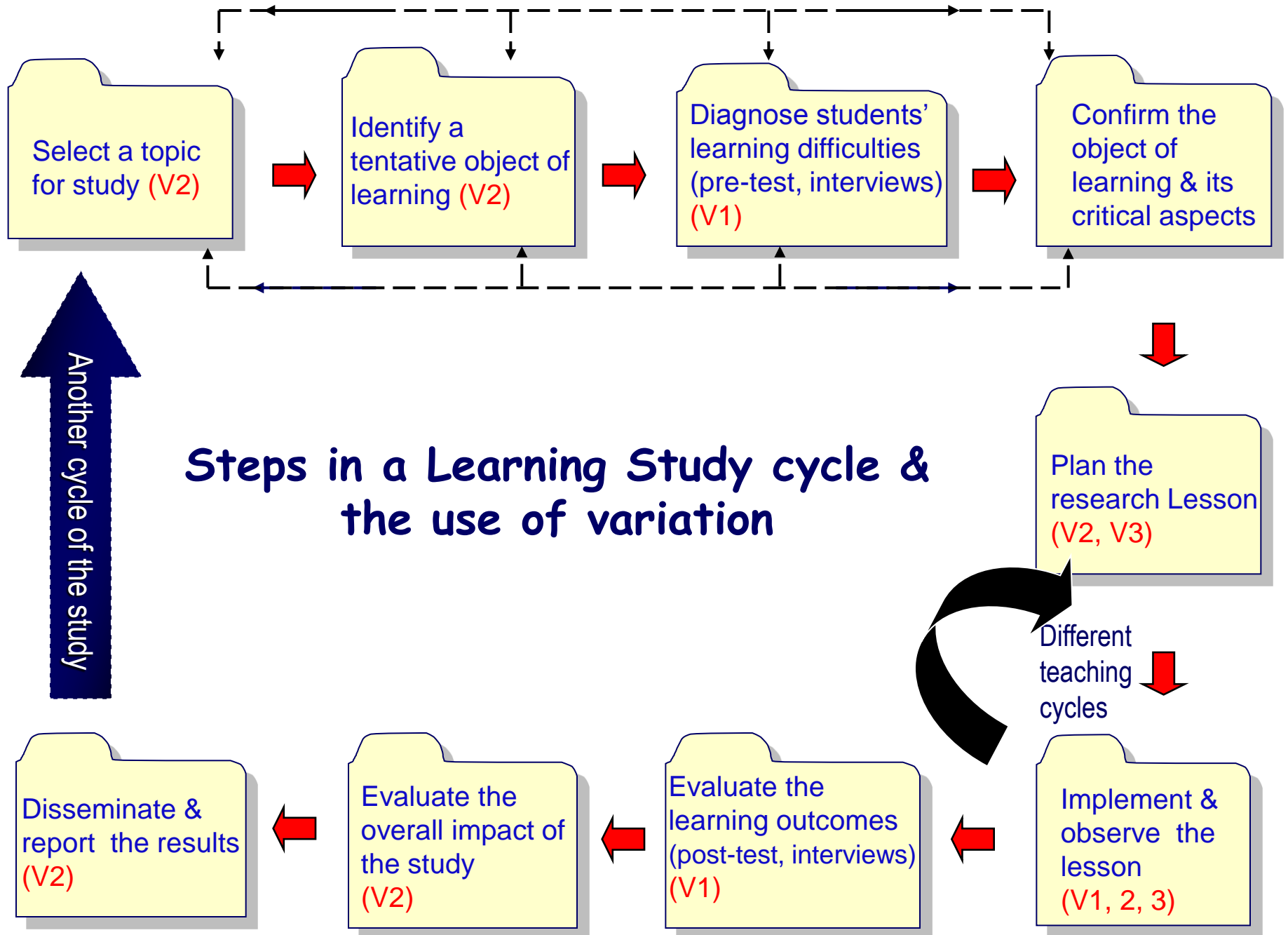
(Teachers need to identify the critical features before teaching.)

Variation Theory

How to learn ?

- We human beings can only focus on one feature at a time.
- Learning is a discernment and discernment can be best achieved through variation (Japanese).
- In order to discern the critical features, a person needs to experience variation corresponding to these features (wishing well).

(Teachers need to draw students' attention to CFs via variation.)



Theoretical framework of Learning Study

Focusing on the object of learning

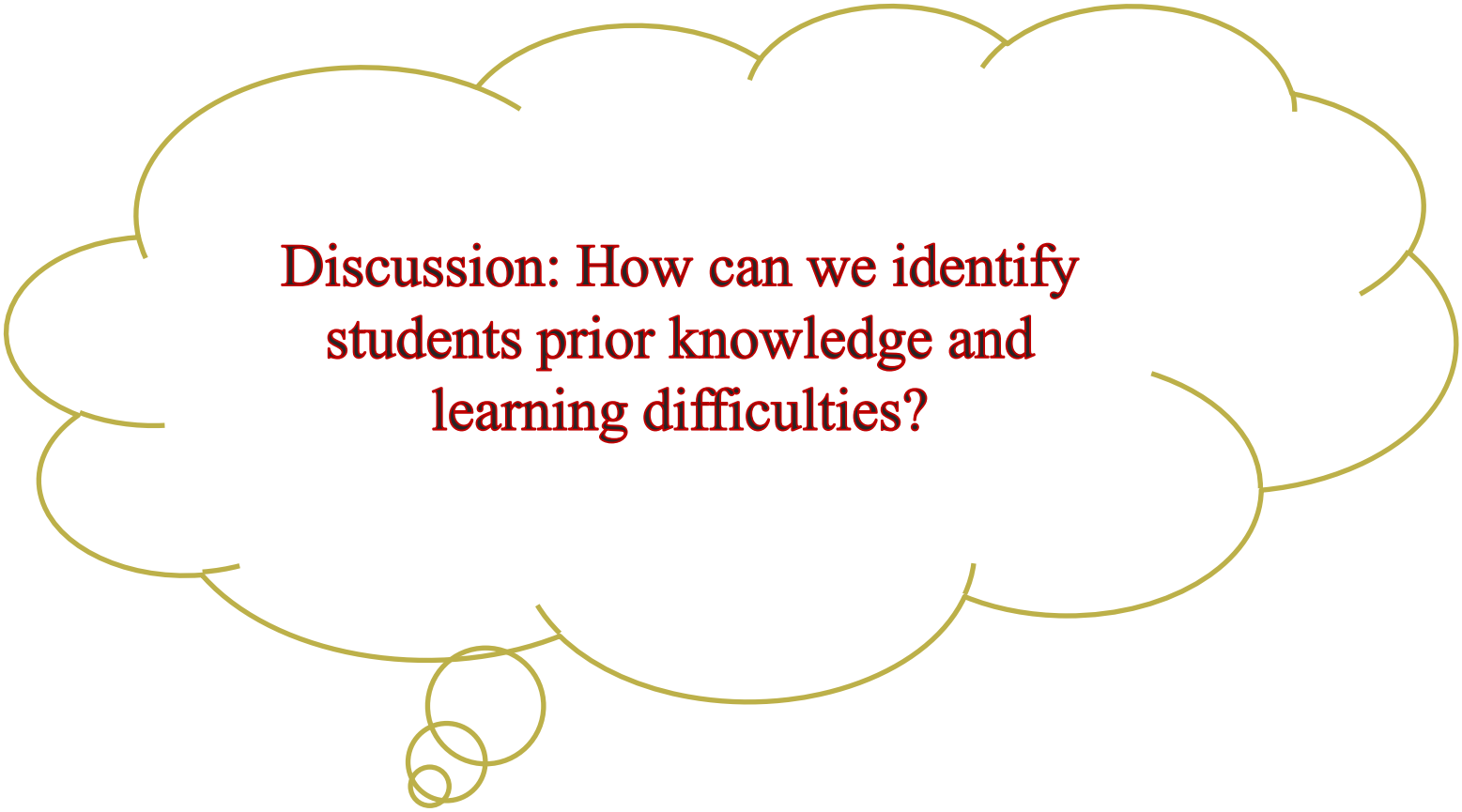
It is guided by three types of variation:

V1: Variation in pupils' ways of seeing the object of learning

V2: Variation in teachers' ways of dealing with the object of learning

V3: Using variation as a guiding principle of pedagogical design

V1 : *Variation in pupils' ways of seeing the object of learning*



Discussion: How can we identify students prior knowledge and learning difficulties?

Ways of identifying learning difficulties

- **Observation**
- **Speaking, listening, reading and writing tests /assignments**
- **Diagnostic tests / marking**
- **Diagnostic interviews /questioning (questioning in class)**

Diagnostic tests / marking

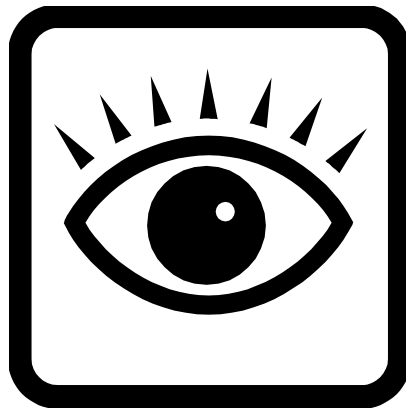
- Include different levels of questions
- Structure of the pre-test
 - Prior knowledge
 - object of learning
 - knowledge transfer
- Include questions about the thinking process / use of strategies
- Match the questions with the focus



Diagnostic tests / marking

- Work out the marking rubric with the expected structure of knowledge
- Marking focuses on the wrong answers of students
- Categorize students' wrong answers and identify the reasons behind (coding)

Recognizing and catering for different learning style

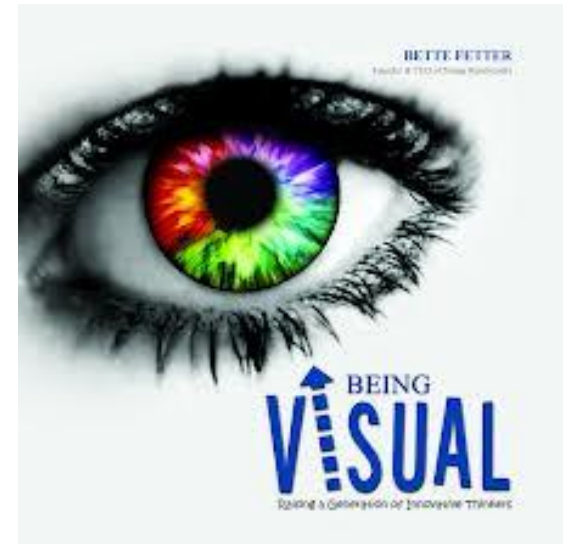


<http://www.personal.psu.edu/bxb11/LSI/LSI.htm>

<http://www.edutopia.org/multiple-intelligences-learning-styles-quiz>

Visual

- **Mind sometimes strays during verbal activities**
- **Observe rather than acts or talks**
- **Likes to read**
- **Usually a good speller**
- **Memorizes by seeing graphics or pictures**
- **Not too distractible**
- **Finds verbal instruction difficult**
- **Has good handwriting**
- **Remembers faces**
- **Uses advanced planning**
- **Doodles**
- **Quiet by nature**
- **Meticulous, neat in appearance**
- **Notices details**



Hints for the Visual Learner

- **Take notes**
- **Make pictures**
- **Highlight key details**
- **Watch his /her face and gestures**
- **Check instructions**
- **Imagine**
- **Use color coding**
- **Study in a quiet place**
- **Keep a note pad**
- **Visual review**



Auditory

- **Talks to self aloud**
- **Enjoys talking**
- **Easily distracted**
- **Has difficulty with written directions**
- **Likes to be read to**
- **Memorizes sequentially**
- **Enjoys music**
- **Whispers to self while reading**
- **Distracted by noise**
- **Hums or sings**
- **Outgoing by nature**
- **Enjoys listening activities**



Hints for the Auditory Learner

- **Say aloud**
- **Play a tape recorder**
- **Summarize**
- **Say words silently**
- **Brainstorm**
- **Discuss**
- **Tell**
- **Explain**
- **Sing**
- **...**



Kinesthetic

- **Likes physical rewards**
- **In motion most of the time**
- **Likes to touch people when talking**
- **Taps pencil or foot when studying**
- **Enjoys doing activities**
- **Reading not a priority**
- **Poor speller**
- **Likes to solve problems by physically working through them**
- **Will try new things**
- **Outgoing by nature;**
- **Expresses emotions by physical means**
- **Uses hands while talking**
- **Dresses for comfort**



Hints for the Kinesthetic Learner

- Draw
- Trace words
- Role play
- Type
- Take notes
- Construct models
- Use a multi-sensory approach (hearing, seeing, touching and doing)
- Give yourself a reward, a cookie, a walk around the block, listen to one song, etc.



Ways of identifying learning difficulties

- **Observation**
- **Speaking, listening, reading and writing tests /assignments**
- **Diagnostic tests / marking (contextual clues)**
- **Diagnostic interviews /questioning**



Diagnostic interviews to identify pupils' ways of seeing the OL

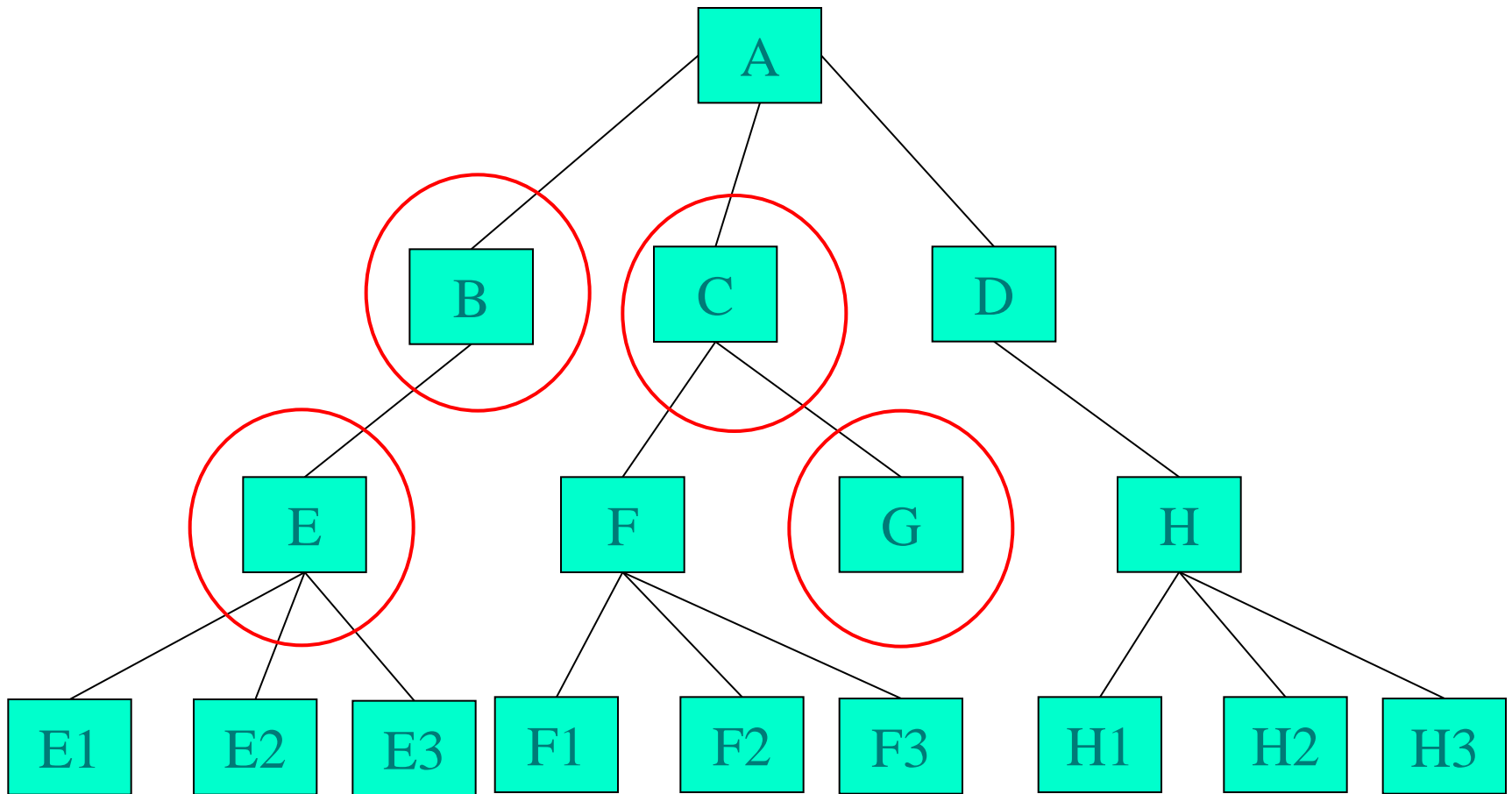
- a) Students' existing **intuitive experience /prior knowledge** (已有知識) may hinder or even counteract their new ways of seeing **vapour**
- b) Some students **cannot focus on the critical features**. (**tenses**)
- c) Some students have not encountered **appropriate opportunities** of learning the critical features **the earth; story telling**

Diagnostic interviews/questioning

- Do not always provide correct answers to students (stay neutral)
- Aim to find out
 - ❑ the exact understanding of students
 - ❑ the thinking process
 - ❑ use of strategies
 - ❑ reasons behind learning difficulties
- Use many ‘how-’ and ‘why-’ questions



Identifying appropriate critical features



- Wh- questions

Many students are not able to form grammatically-correct WH-questions in English (V1)

What...

When...

Where...

Why...

Who...

There are many possibilities...

- What did he go last night?
- Where was he go last night?
- Where he went last night?
- Where were he last night?
- Where does he go last night?
- Where did he went last night?
- He went where last night?

The critical aspects of grammatically correct WH- questions

- Question words (what, when, why, where, who)
- Verb-to-do/ Verb-to-be
- Subject-verb inversion
- Subject-verb agreement
- Tenses
- Do/Did/Does+infinitive
- Word order

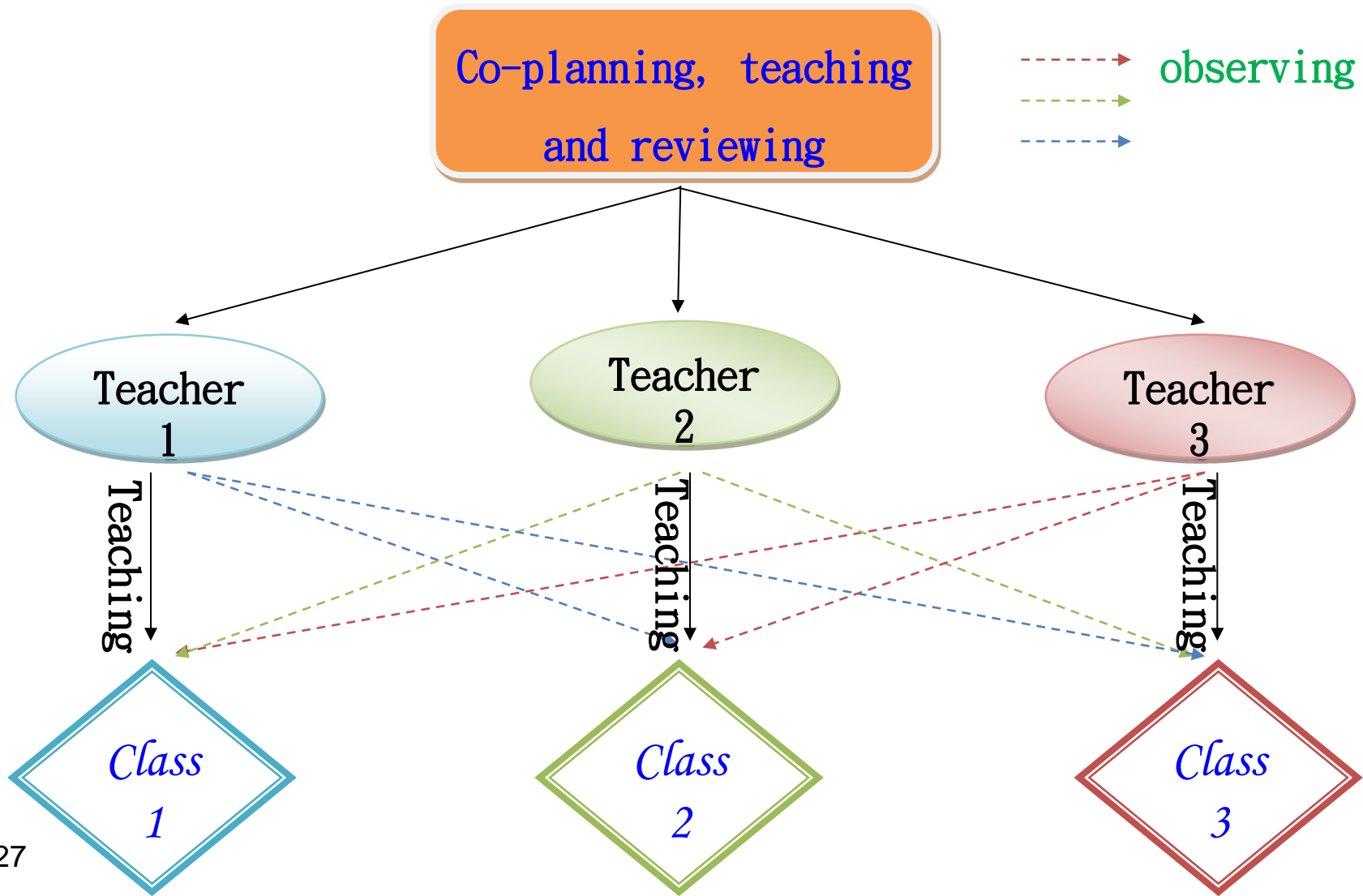
Implications

Teach with student-appropriate object of learning, teaching strategies, teaching resources and assessment tools.



V2: Variation in teachers' ways of dealing with the object of learning

- **Provide an appropriate platform for teachers of different background to contribute to teaching and learning.**
 - e.g., **Wishing well**



V3 : *Using variation as a guiding principle of pedagogical design*

- **Theory of Variation**

Learning is a function of discernment and discernment can be best achieved through variation that highlights critical features.

Lo, Pong & Chik (Eds.) (2005). For each and everyone: catering for individual differences through Learning Studies.

Marton, F. & Booth, S. (1997). Learning and Awareness.

The functions of Variation

- Variation for Generalizing Rules
- Variation for Comparing Differences
- Variation for Separating Concepts
- Variation for Integrating Features

Variation for Generalizing Rules

- ◆ To show the commonalities / sameness for students to discovering patterns and infer rules

The rainbow multiples

Generalizing Variation helps students to inferring the rules effectively.

Variation for Comparing Differences

- ◆ To compare the differences between the good and the bad, the right and the wrong, the whole and the parts, an example and a non-example, different examples and experiences

colours and feeling

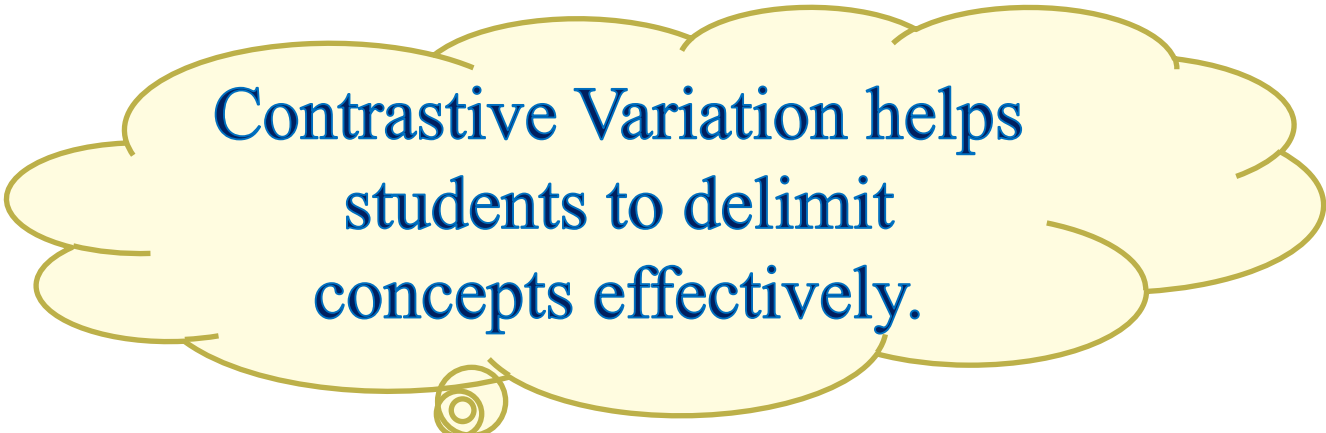
vapour

fractions

picture description

L1 & L2

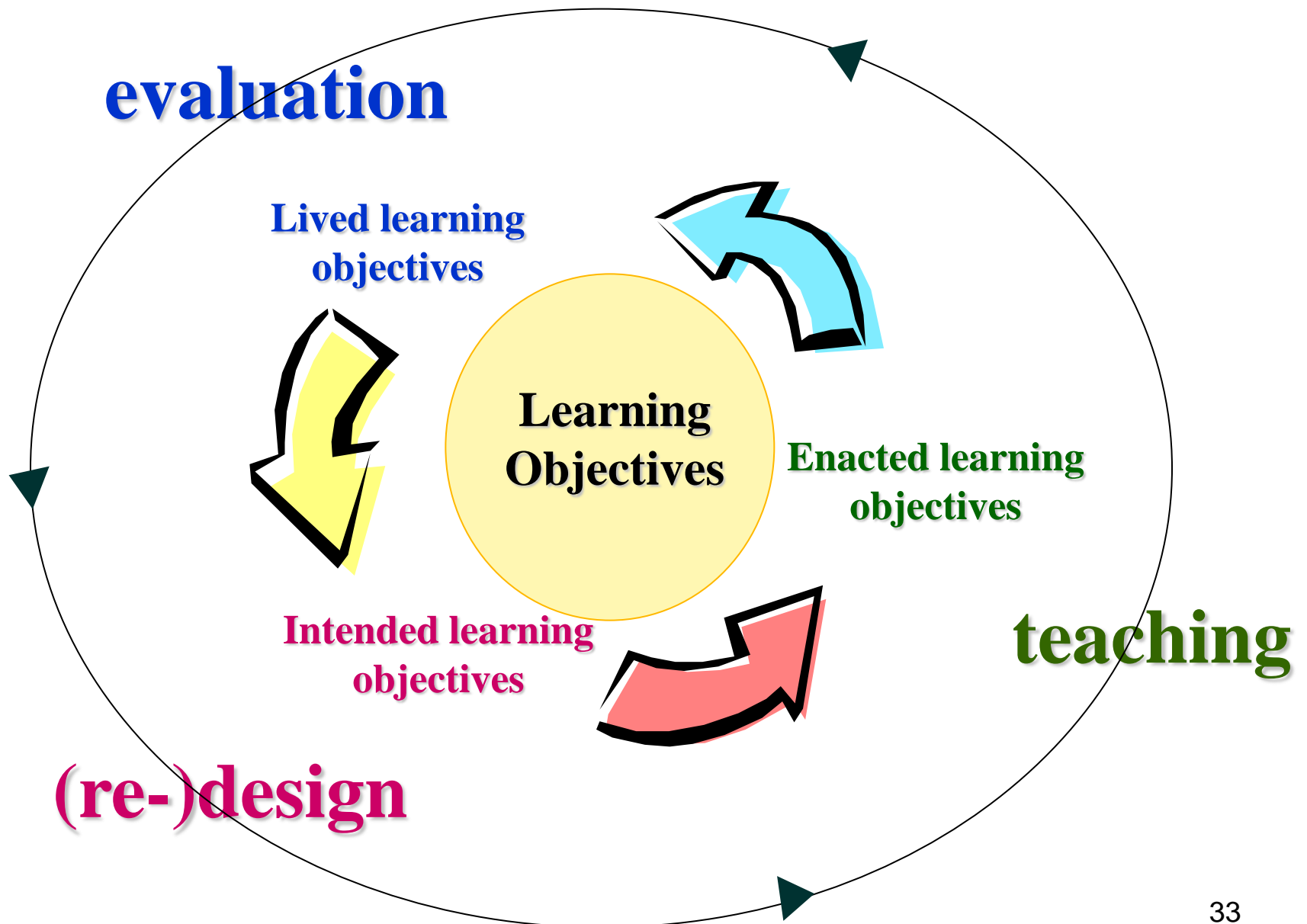
discrimination



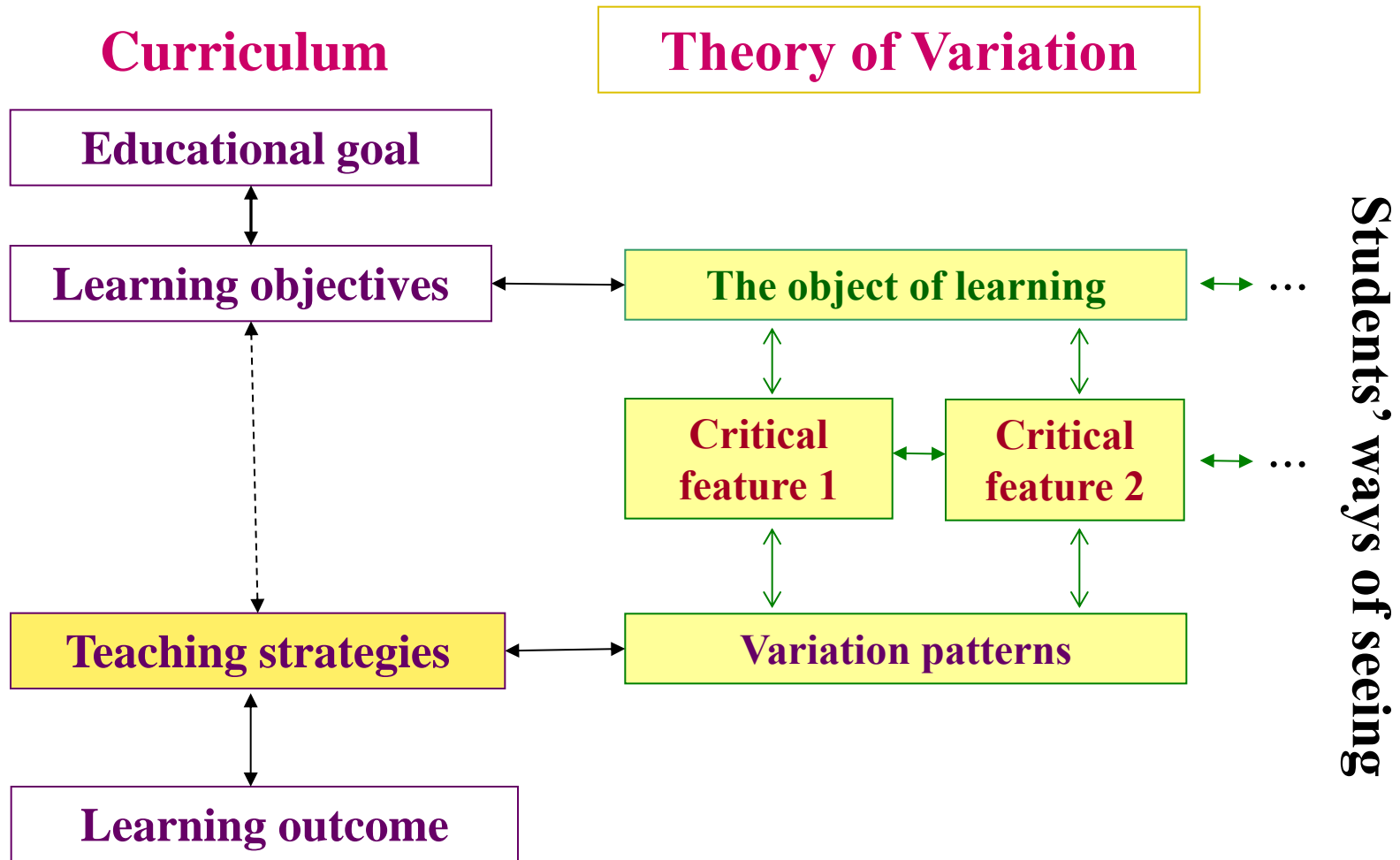
Contrastive Variation helps
students to delimit
concepts effectively.

Variation Patterns

- **Variation** is controlled focused organized changes/differences in the teaching arrangement (including language, examples, activities, etc.) .
 - Controlled with some features kept constant (verb and object)
 - Focusing on the CFs
 - Organized to logically illustrate the structure of CFs



Enhancing Teaching via Variation



Teaching is a deliberate art!

Through learning study,

- Teachers are more sensitive to student learning
- Teachers choose the CFs more carefully
- Teachers teach with variation systematically and purposefully

Useful websites

1. Centre for Learning Study
(<http://www.ied.edu.hk/cls>)
2. Learning Study Forum
(<http://www.learningstudies.hk>)
3. TALON
(<http://www.ied.edu.hk/talon/>)
4. WALS 2013
(<http://www.walsnet.org/2013/>)