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Critical Thinking and Scaffolding Activities

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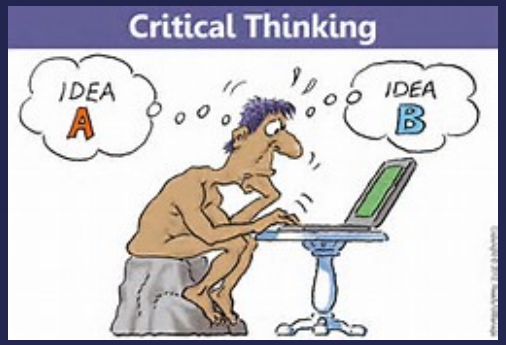
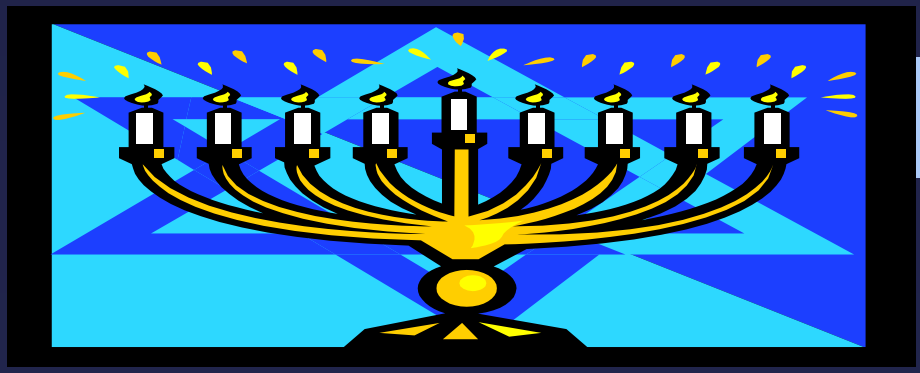




The goal of this talk is to support all students/learners in inclusive environments by maximizing available expertise through professional collaborations.

Importance of critical thinking

Albert Einstein (1879-1955) said

“Education is not the learning of facts but training the mind to think”.

Benjamin Franklin (1706-1790) said:

"Tell me and I forget, teach me and I may remember, involve me and I learn.”

Importance of critical thinking

Xunzi or Kuang Xun (312-230 BC) said

“闻之不若见之，见之不若知之，知之不若行之"

‘I hear and I forget. I see and I remember. I do and I understand.’

Importance of critical thinking

Combining these 3 quotes - it is **“think”, “involve”,** and **“do”**, which is exactly what critical thinking is –

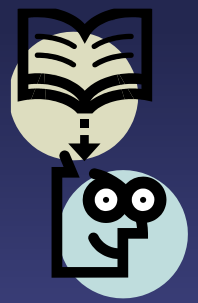
- it involves a whole process of hearing, observing, thinking, analyzing, debating, inferring, synthesizing, evaluating, conceptualizing, and applying to reach an answer or conclusion.
- It is disciplined thinking that is clear, rational, open-minded, and informed by evidence.
- it is action / an process of ongoing debating.

Recommendable theory given by Confucius (551?-479? BCE)

similar to critical thinking or learning effectively

“博学之，审问之，慎思之，明辨之，笃行之”。-《礼记·中庸》

- Study extensively, inquire prudently, reflect carefully, differentiate things clearly, and put what you have learned into practice persistently.



Is critical thinking teachable/learnable?

Y E S

“Students come without training in it (critical thinking), while faculty tend to take it for granted as an automatic by-product of their teaching. Yet without critical thinking systematically designed into instruction, learning is transitory and superficial."

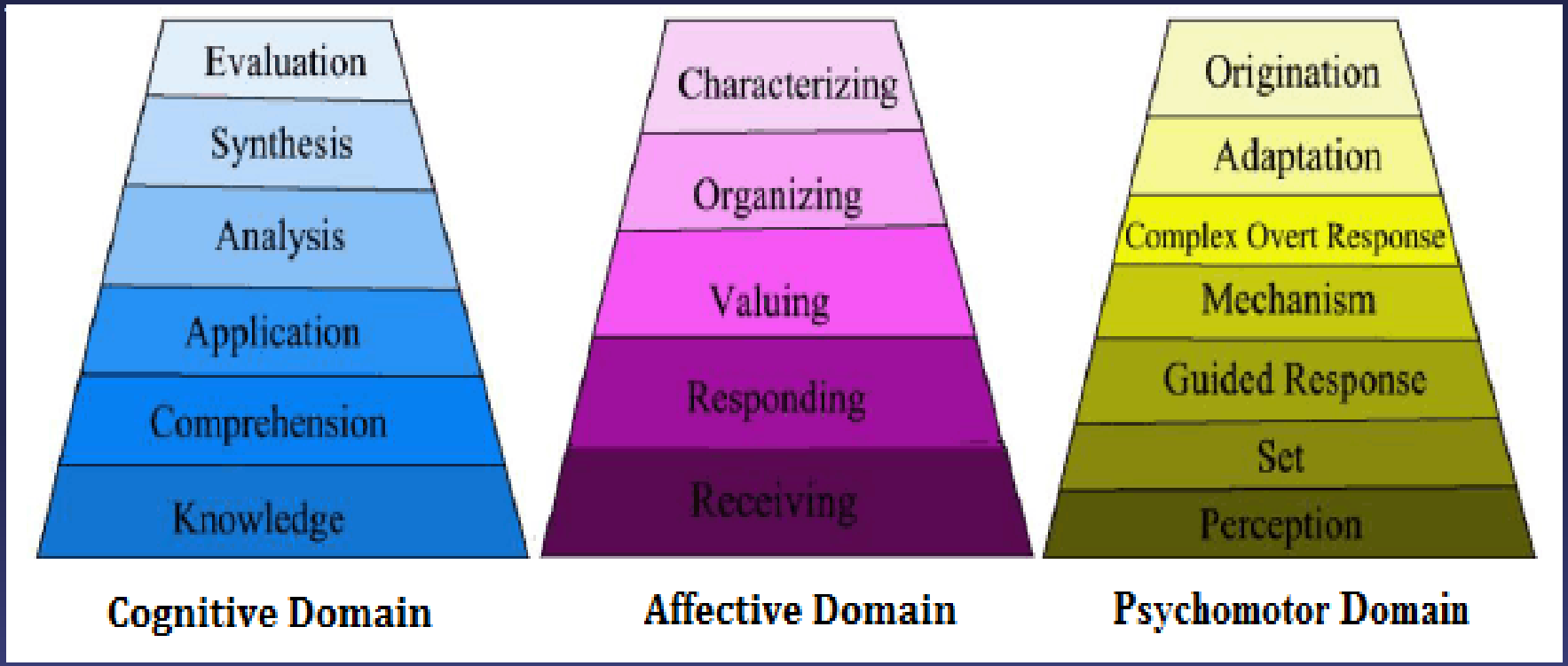
The theoretical background

Bloom's Taxonomy

- created by Benjamin Bloom in 1956 to categorize the levels of reasoning skills that students use for effective learning.
- identifying three "domains" of learning (see below), each of which is organized as a series of levels or pre-requisites.
- The **Cognitive** being the most-used of the three, refers to knowledge structures as a sequence of progressive contextualization of the material.

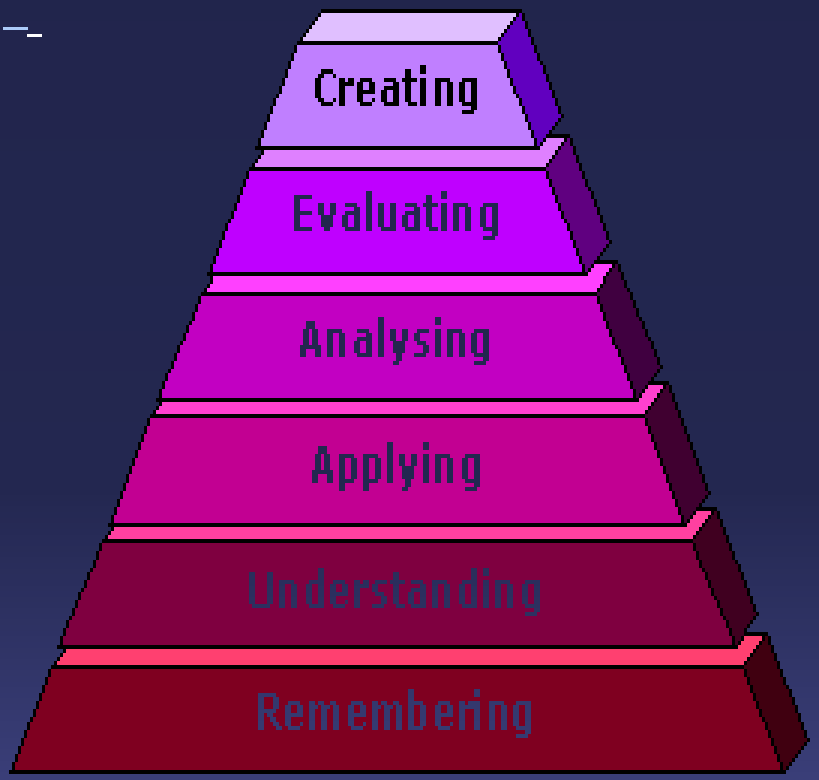
The theoretical background

- ~~Bloom's Taxonomy~~



The theoretical background

~~*This model was revised by Anderson and Krathwohl in 2001 (see below). The modification seems to be minor but actually significant:~~



Note the new top category, which is about being able to create new knowledge within the domain, and the move from nouns to verbs.

The theoretical background

~~Revised Bloom's Taxonomy: Cognitive Domain~~

Original Terms	New Terms
Evaluation	Creating
Synthesis	Evaluating
Analysis	Analysing
Application	Applying
Comprehension	Understanding
Knowledge	Remembering

The theoretical background

- **Jean Piaget's stages of cognitive development:**
-
- Piaget divided intellectual development into 4 unique periods that are indicative of the changes in children's cognitive structures.
  - *The Sensorimotor Period (0 to 2 Years).)*
  - *The Preoperational Period (2 to 7 Years)*
  - *The Period of Concrete Operations (6/7-11 years)*
  - *The Period of Formal Operations (11/12 years on)*

The attainments of earlier stages are essential for those in later periods of development. -- emphasis on life stages / time periods

The theoretical background

Lev Vygotsky's Sociocultural Theory

- In contrast to Piaget's theory, Vygotsky's theories stress the fundamental role of social interaction in the development of cognition instead of specific processes in timed periods (Vygotsky, 1978; Wertsch, 1985) -- “Every function in the child’s cultural development appears twice: first, on the social level, and later, on the individual level; first, between people and then inside the child.”
- “More Knowledgeable Other” (MKO)
- “Zone of Proximal Development” (ZPD)

Emphasis on the role of social interaction in the development of cognition

The theoretical background

Lev Vygotsky's Sociocultural Theory

"More Knowledgeable Other"

The MKO refers to anyone who has a higher cognitive ability than the individual (i.e. a parent, coach, teacher, etc.). The individual learns by observing, modeling, and interacting with the MKO.

Zone of Proximal Development

The ZPD refers to the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability solving the problem independently. Through scaffolding, an MKO can provide the framework for the individual to achieve success at a higher level.

Teaching/learning Paradigms used in the models

Against the background "student-centered" or "robot-assisted", it is probably appropriate to say that in these models:

- the teacher is more or less like a mentor or facilitator – if not a "servant professor", and
- the students are learners or apprentices, though their prior knowledge or current cognitive ability will decide how the teacher will design the activities and in what way the task will be fulfilled.

Suggested Scaffolding Activities 1:

Model 1

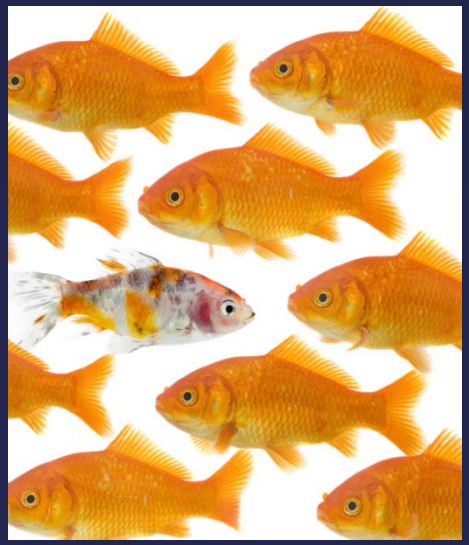
From visuals to in-depth analyses

What do you see here?

What did you learn from this observation experience?

Purpose: approaching the same thing/issue from different perspectives

What do you think of the pictures?



What did you see here?

Now what happened to the fish?

What did you learn from this observation experience?

Purpose: sequence & boundary; space & time; bias; expansion of knowledge; form of concepts – way of thinking or approach to knowledge

What did you learn from these pictures?








If you have the following words to use for each picture, which word will go to which picture?

- Joyful
- Thoughtful
- Humorous
- Sentimental
- Aggressive /annoyed
- Amiable
- Impatient /Bored
- Friendly /open

Purpose: non-verbal language; different aspects of personality; celebrities' or politicians' life; media

Suggested Scaffolding Activities 2:

Model 2

Positive Exploring of Self-interest

Model 2： Positive Exploration of Self-interest

Which do you think is a big issue for you?

Model 2：Positive Exploration of Self-interest

Which do you think is a big issue for you?

Money management

Junk food

Too much distraction

Too many obligations

Bad environment

Time Management Tips

Suggested Scaffolding Activities 2:
Positive Exploring of Self-interest

Who is your favorite celebrity? Why?

[for topics: media; popular culture; values/ethics]

What type of work/job do you prefer to do? why?

[for topics: jobs / workplace / CSR / balance of work and life / trends of work and leisure time]

Recommend a story that impresses you most.

[for abilities: memory; summary; evaluation; narration]

If you were a teacher, what kind of student would you like to have?

[for skills: assumption; reasoning; perspective taking]

Suggested Scaffolding Activities 3:

Model 3

Simple logic training:

- Comparison & Contrast
- Cause & Effect / problem & Solutions
- Categorization
- Sequential order:
  - Temporal (chronological)
  - Spatial
  - From the most to the least importance

Suggested Scaffolding Activities 3: logic comparison and contrast

1. If I say “my nose is better-looking than his mouth”, what is your first response?
2. If I say “she is up to now my best girl-friend; however, I am still sitting on the fence”. How do you understand my statement?
3. If I say that compared with other multi-national companies, this *oil spill incident* indicates that British Petroleum did not have environment protection measures at all. Do you agree with me?

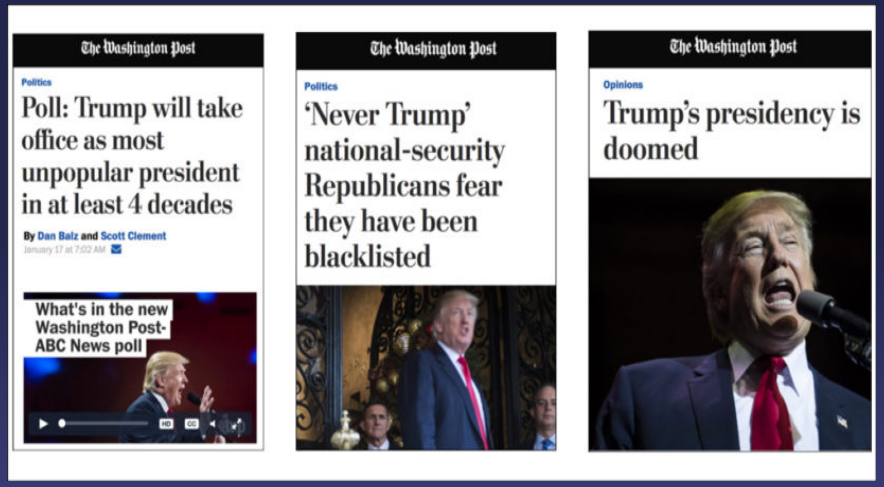
Suggested Scaffolding Activities 3: logic comparison and contrast

What kind of issues do these groups of pictures tell you?

Why do these commercial activities exist?

Suggested Scaffolding Activities 3: logic comparison and contrast

What might be the nature of media?



Suggested Scaffolding Activities 3: Logic
cause & effect / problem & solution

Pair work:

Write down 2 problems for your partner to solve; and explain to each why.

Suggested Scaffolding Activities 3: Logic cause & effect / problem & solution

Do you see the relationship between the pictures? Can you describe it?

Suggested Scaffolding Activities 3: Logic Categorization

Question

Can you talk about the pollution issue in your hometown? What can be done to respond to the problem?

[the question is huge and there are many ideas for students to talk about: prior knowledge and personal experience; therefore, the big concern is how to make the answer better organized and in a logical way.

Suggested Scaffolding Activities 3: Logic Categorization

Possible answer

Pollutions:

Air pollution

Water pollution

Soil pollution

Noise pollution

Light pollution

Thermal pollution

Radioactive pollution

Personal pollution

Suggested Scaffolding Activities 3: Logic Categorization

Possible answer

personal or individual

- Turning off the light when leaving the room
- Riding bicycles instead of driving cars
- Recycling garbage

community or organization

- donating money to environmental organizations
- joining in environment protection activities such as cleaning rivers and beaches

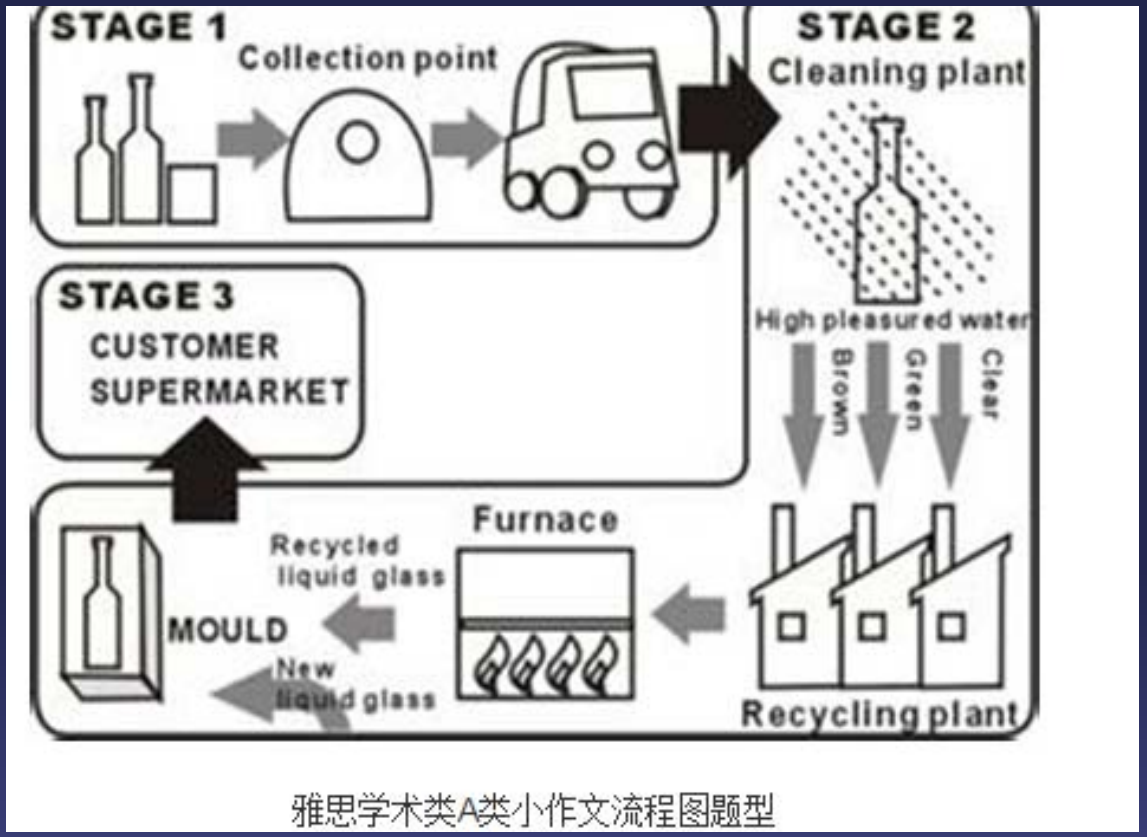
business or enterprises,

- purchasing office supplies that are environmentally friendly
- buying recyclable papers or inks that have less toxic substances
- reducing production of pollutants in the air

government or law

- publishing policies or laws to prohibit industries from producing certain amount of pollution
- mobilizing the whole communities or citizens to plant trees or build more parks
- restricting the amount of cars on the street

Suggested Scaffolding Activities 3: Logic
Sequential order



雅思学术类A类小作文流程图题型

Suggested Scaffolding Activities 3: Logic
Sequential order

Re-order the following sentences

- **Giving Blood**

- 1. First blood donor lies down with his arm on a pillow.
- 2. As the nurse does this, the blood begins to flow into a bottle until it is full. Meanwhile the donor opens and closes his hand to increase the flow.
- 3 Before giving blood, the donor is given tests to determine his blood group and make sure he is not suffering from certain diseases.
- 4. At this stage the nurse cleans his skin with ether and inserts the needle into a vein.
- 5. When this has been done his blood can be taken.
- 6. As soon as the bottle is full the nurse takes off the sphygmomanometer and withdraws the needle.
- 7. The blood is immediately labeled and refrigerated.

Suggested Scaffolding Activities:

Model 4

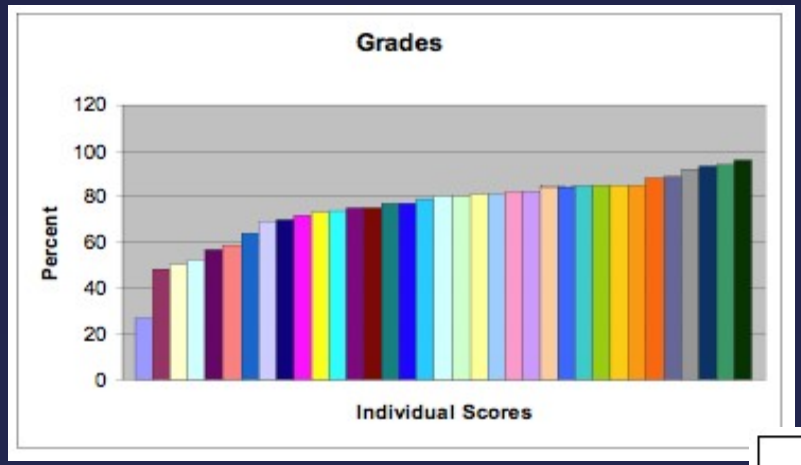
Heuristic (in philosophy**)**

- **Socratic: questions**
- **Confucius: conversation / dialogue**

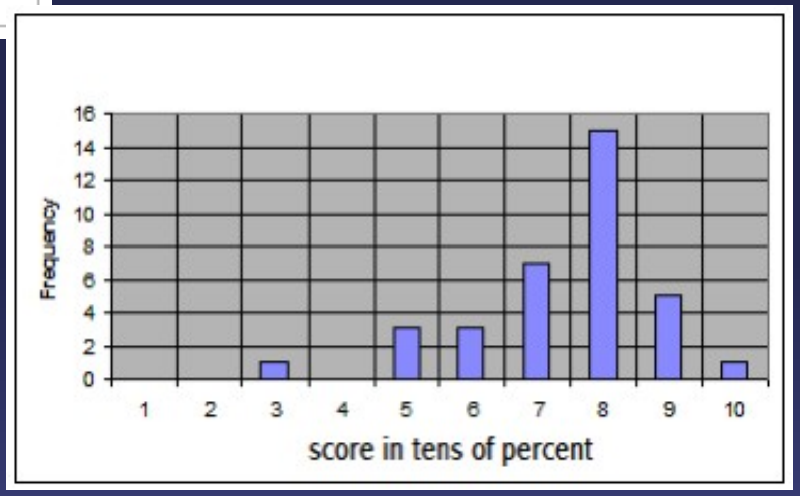
"Heuristic device":

- ✓is used when an entity X exists to enable understanding of entity Y;
- ✓presents an orientation-point for development;

Suggested Scaffolding Activities: heuristic



These 2 graphs reveal the same information. Which do you prefer? Why?



Suggested Scaffolding Activities: heuristic

Based on the clues shown on this picture, write a story based or character portrait

Suggested Scaffolding Activities: heuristic

Question 1

Scenario: A shoe marketer goes to an island. He discovers that all the islanders do not wear shoes.

Question: What might be the two possible marketing plans he will write?

Question 2

How do you understand the proverbs?

- Cut your coat to suit your cloth.
- Three humble shoemakers brainstorming will make a great statesman. / Two heads are not always better than one.

Suggested Scaffolding Activities: heuristic

Question:

Which graduate would you hire - the one with a certificate from a Chinese university or the one with the same type of certificate but from a famous western university?

Answer:

I hire the one who can answer my interview questions better.

Reminders
Scaffolding Activities

- Pre-requisites / prior knowledge and cognitive competences are required to conduct a responsive and reciprocal class
- Engaging and challenging the students should be properly balanced in order not to damage their self-esteem.
- There is no single program, resource, intervention, or model that can address all needs.
- Open-ended questions are asked; immediate feedback is given from the tutor.
-

Something deserving attention:

Students with Impediment

- The National Behaviour Support Service (NBSS) in the US pointed to the association / connections between failure / academic achievement with reading and behaviour difficulties.