LEcTURe WEEK 3
PSYCHOLOGY OF MATHeMATICS LEARNING

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Things to rehearse:
LEARNING PROCESS: organise information, build connection among information and integration with prior knowledge, and eventually construct knowledge, encode knowledge to LTM.

Cognitive approach on learning process:

- Instructional manipulation
- Learning process
  - Learning outcomes
  - Outcome Performance
- Learners Characteristics

SELECTING:

- Sensory Memory
- Attention Perception
- Retention Buffer
- Working Memory
- Long term memory

PATTERN RECOGNITION

FORGOTTEN
PERCEPTION

- The assignment of meaning to incoming stimuli
  - Is the detection of incoming stimuli by your senses
  - Is the process by which stimuli are perceived, recognised and understood

Steps of perception

Detection of a stimuli through senses

Storage of some representation of the stimuli in memory system

Pattern recognition

Assignment of meaning to stimuli

Diameter

10 cm
Detection of a stimuli through senses: stimulus may be seen/heard

Storage of some representation of the stimuli in memory system: stored these into icon/echo

Pattern recognition: circle/writing/sound information from LTM used to recognise pattern

Assignment of meaning to stimuli: select information to assign meaning that is undertaken in working memory

Example: steps of perception

PERCEPTION IS AFFECTED BY

- Nature of stimulus (context of stimulus)
- Background of knowledge

Pattern recognition occurs when elements match!!

Pattern recognition

- Prior knowledge used to make decisions about the meaning of the stimuli
- When stimuli in the environment are recognised as something stored in memory
- Two systems for recognising patterns:
  - Parts to whole (Example?)
  - Whole to parts (Example?)

Theory of pattern recognition (??!!??)
Gestalt theory (PLEASE SEARCH)
PRIOR KNOWLEDGE

- Directly affects perception process
- Allows perception occurs
- Guides perception of new information

CONTEXT

- Influences perception
- May effect if certain features are perceived at all

EXAMPLE OF CONTEXT

![Text Image]
DISCUSS OTHER EXAMPLES OF CONTEXT INFLUENCE PERCEPTION

Educational Implication

- Context in part depends on external environment which the teacher can manipulate
  - Giving directive instructions
- Because pattern recognition is influenced by context, students need to be exposed to different contexts (academic & material) so that they learn how to differentiate them
- Prior knowledge guide perception
  - Activating prior knowledge
  - Perceptions build up their knowledge stored in LTM – prior knowledge for following learning

PLEASE TRY TO PAY ATTENTION ON THE IMPLICATIONS OF PERCEPTION ON MATHEMATICS LEARNING!
ATTENTION

Allocation of cognitive resources to a task

Critical for learning – to process information learners have to pay attention

BUT

Human’s have extremely limited processing capacity!

Tepung Peterseli Ketumbar
Soda Lada Mentega
Saus cabe Kue Sirup
Kentang Matonnaise Bawang
Burger Apel Tomat
Susu Oregano Selada
Saos tomat Telur Baking soda
Sari jeruk Spaghetti Garam
Hot dogs Merica Meises
Cambah Roti Sukade

Limitations

- Generally people cannot attend to more a few things at once
- Under many conditions multi-tasking is not very effective because attention is divided too much, leading to poor executions of tasks (divided attention)
- Automation of skills can compensate for limited attention capacity
Attention Allocation

- The type of **TASK** influences attention allocation
  - Nature of task
  - Nature of need
  - Motivations
- Attention is allocated differently according to the tasks provided

**RESOURCE LIMITED**
A task where performance will improve if more attention is shifted to that task

**DATA-LIMITED**
Performance is limited by the quality of the presented task
Some tasks are so complex that some individuals can never apply enough resources to them because of lack of knowledge

Attention processing

Controlled  Automatic
AUTOMATED PROCESSING

- Occurs without intention and consciousness
- Less cognitive effort
- Less error
- Performance is quicker
- Automated performance
- Develop learning – to more difficult task
- Skilled learners

DISTRACTIONS

- Students are easily distracted
  - Teacher is giving important explanations, students mind starts to ‘wander’ –tuning in to other conversations (sounds), looking out the window (visuals), thinking of other matters (internal cognition)….etc
  - Concentration is dependant on attention
Where is it?
Limited in capacity and duration!
How we learn new task?
How we learn difficult task?
What is the role of automated prior knowledge from LTM
What is the educational implication?
What is the strategy to improve processing information in WM?

Where Prior knowledge is stored
How do we store first time ever “new knowledge”
In what form (structure) knowledge is stored in LTM?
How we recall knowledge in LTM
- Automated vs controlled
- Types of knowledge
- Schema and the role of chunking information
SELECTING PATTERN RECOGNITION LEARNING PROCESS: organise information, build connection among information and integration with prior knowledge, and eventually construct knowledge, encode knowledge to LTM.

FORGOTTEN YOUR ATTENTION PLEASE!!!

YOUR ATTENTION PLEASE!!!