

# Overview

- ▶ What is learning?
- ▶ Characteristics of learning
- ▶ Memory
- ▶ Learning to Learn
- ▶ Bloom's Taxonomy
- ▶ Kolb's Experiential Learning Cycle

# What is Learning?

- ▶ Is it a change in behaviour or understanding?  
Is it a process?
- ▶ For real learning to occur, there must be change - change in what we know and understand, or in what we do. There can be problems if attempts to learn or teach do not result in change.

# What is Learning?

- *An increase in knowledge.* Something done to a student, rather than something he does for himself.
  - *Memorising.* Student actively memorises but the information is not transformed in any way.
  - *Acquiring facts or procedures to be used.* Includes skills, algorithms, formulae which you will need to do things later. Still no transformation of what is learnt by learner.
  - *Making sense.* Student makes active attempts to abstract meaning in the process of learning. You've got to be able to explain things, not just remember them.'
  - *Understanding reality.* Learning enables you to perceive the world differently. It is 'personally meaningful'.
- ▶ Clear qualitative shift between 3 & 4. Argued that 1, 2 & 3 are views that underpin surface learning, while 4 & 5 relate to deep learning.

# What is Learning?

- ▶ Depends on whether you are focusing on learning as an:
  - internal process (where information taken in by your senses is processed by the brain)
  - a series of external inputs and outputs.
- ▶ Neuroscientists haven't yet given a complete answer.
- ▶ External inputs and outputs are easier to track than the internal goings on that forge connections between the two.
- ▶ Certainly, outputs of learning are relatively easy to recognise (you can demonstrate that you know/can do something).

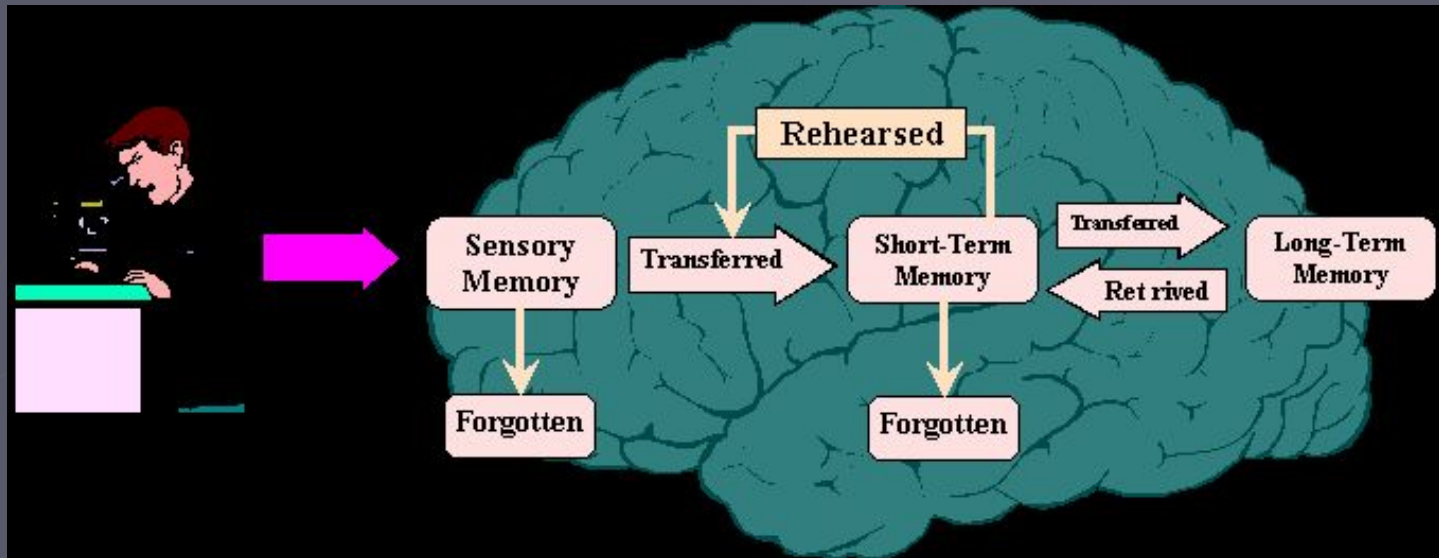
# Some characteristics

- ▶ Learning is both a process and an outcome
- ▶ Learning is both formal and informal
- ▶ Learning is both conscious and unconscious
- ▶ Learning is both nice (fun) and nasty
- ▶ Learning is both planned and accidental
- ▶ Learning is both desirable (useful/beneficial) and undesirable (inappropriate/harmful)
- ▶ Learning is both incremental and transformational
- ▶ Learning is both social and a solitary activity

# Some Characteristics

- ▶ Learning is both reactive and proactive
- ▶ Learning is about both acquiring knowledge and skills
- ▶ Learning is both voluntary and compulsory
- ▶ Learning is both recognised and unrecognised
- ▶ Learning is both supported and unsupported
- ▶ Learning is both shared and private
- ▶ Learning is both superficial (rote) and deep (internalising the principles)

# Memory



- ▶ **Input of sensory information starts at top, goes through “sensory memory” or a “sensory buffer” into short-term memory (STM), and hence to long-term memory (LTM).**
- ▶ **Note 2 points:**
  - **process is selective and “lossy” (at each stage information is filtered, selected and even altered).**
  - **Progression to LTM (if it is reached) may well take less than a minute!**

# Memory

- ▶ Information may only stay in Sensory Buffer for about  $1/15$  of a second, while brain assembles it to “make sense”.
- ▶ Consider the illusion by which a series of still pictures presented rapidly appear to be moving (basis of all cinematography).
- ▶ Once frame rate drops below about 16 frames per second, however, we may well become conscious of the flicker or jumps from one still image to another.
- ▶ Similarly, we don't hear a series of phonemes (or speech sounds), but complete words or phrases: it is as if the brain waits to assemble a meaningful sound before passing it onto the next stage.



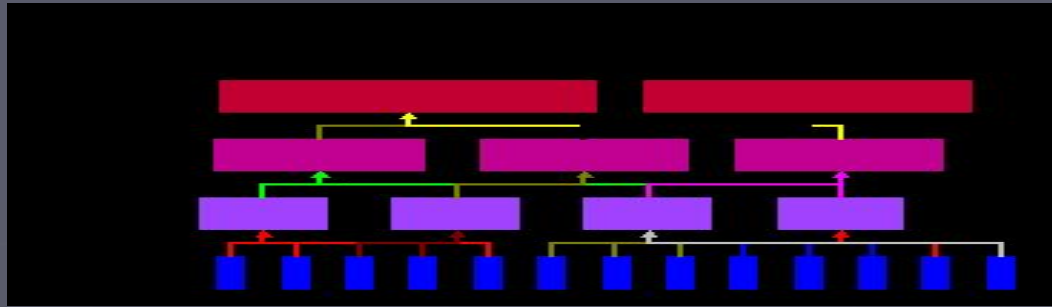
# Memory - STM

- ▶ Holds material for about 15-30 seconds, although this can be expanded by practice.
- ▶ You can see how disabling damage to STM is, (eg. Dementia).
- ▶ Has a capacity of seven items (plus or minus two).
- ▶ However, "items" are defined by meaning rather than size.
- ▶ May be hard to remember telephone numbers of more than seven digits, but if "0141" is remembered as "Glasgow" it becomes just one item, and remembering "8,4,8,3,5,4,1" becomes simpler. If that too is "chunked" as "my work 'phone number" it is even easier.
- ▶ Assumes that the label of the "chunk" already exists in LTM.

# Memory - LTM

- ▶ Theoretically, LTM has infinite capacity and lasts for the rest of your life.
- ▶ Has been suggested LTM has three components:
  - **Semantic** memory stores concepts and ideas
  - **Episodic** memory contains memories of events.
  - **Procedural** memory concerns skills and “know-how” rather than “know-that” knowledge.

# Learning How to Learn - Bateson



- ▶ **Learning 0** is direct experience: I put my hand in the fire – it gets burned.
- ▶ **Learning 1** is what we routinely refer to as "learning": generalisation from basic experiences. I have experienced "hand in fire" and "being burned", and I won't do it again.
- ▶ **Learning II** contextualises Learning I experiences. I don't generally risk getting burned, but I might do so to save someone else from a fire.
- ▶ **Learning III** contextualises Learning II, and is not fully understood: What does it say about me that I would risk getting burned in order to ...?

# Learning to Learn – Deep/Surface

Deep	Surface
Focus is on “what is signified”	Focus is on the “signs” (or on the learning as a signifier of something else)
Relates previous knowledge to new knowledge	Focus on unrelated parts of the task
Relates knowledge from different courses	Information for assessment is simply memorised
Relates theoretical ideas to everyday experience	Facts and concepts are associated unreflectively
Relates and distinguishes evidence and argument	Principles are not distinguished from examples
Organises and structures content into coherent whole	Task is treated as an external imposition
Emphasis is internal, from within the student	Emphasis is external, from demands of assessment

# Learning to Learn – Deep/Surface

- ▶ Surface learner is trying to “suss out” what the teacher wants and to provide it, and is likely to be motivated primarily by **fear of failure**.
- ▶ Surface learning tends to be experienced as an uphill struggle, characterised by fighting against boredom and depressive feelings.
- ▶ Deep learning is experienced as exciting and a gratifying challenge.

# Learning to Learn – Deep/Surface

- ▶ Although learners may be classified as “deep” or “surface”, they are **not attributes of individuals**: one person may use both approaches at different times, although learner may have a preference for one or the other.
- ▶ They correlate fairly closely with motivation: “deep” with intrinsic motivation and “surface” with extrinsic, but they are not necessarily the same thing. Either approach can be adopted by a person with either motivation.

# Learning to Learn – Deep/Surface

- ▶ Third form, known as the “**Achieving**” or strategic approach - a very well-organised form of Surface approach, and in which the motivation is to get good marks.
- ▶ The exercise of learning is construed as a game, so that acquisition of technique improves performance. It works as well as the analogy: insofar as learning is not a game, it breaks down.

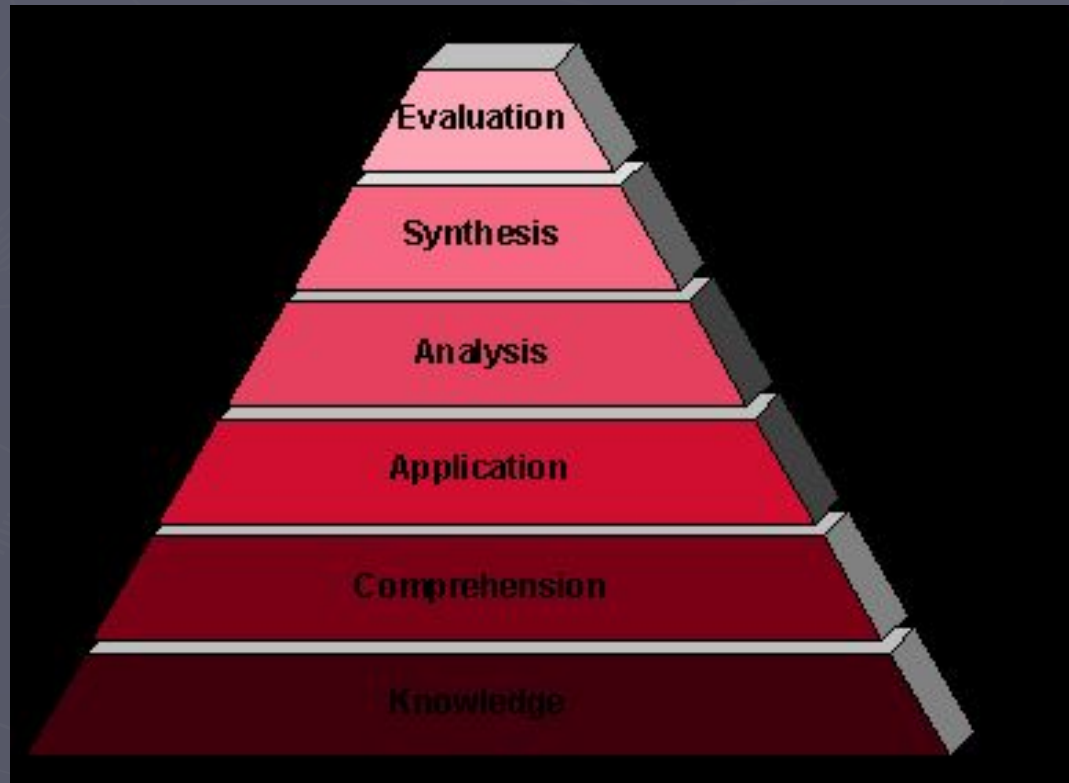
# Bloom's Taxonomy

- ▶ Identifies 3 “domains” of learning, organised as a series of levels or pre-requisites.
- ▶ Suggested that one cannot effectively — or ought not try to — address higher levels until those below them have been covered (but may not necessarily cover all levels).
- ▶ Thus in Cognitive domain, training for technicians may cover knowledge, comprehension and application, but not concern itself with analysis and above.
- ▶ Whereas full professional training may be expected to include this and synthesis and evaluation as well.



# Bloom's Taxonomy – Cognitive Domain

- ▶ The most-used of the domains, refers to knowledge structures (although sheer “knowing the facts” is its bottom level). It can be viewed as a sequence of progressive contextualisation of the material.



# Bloom's Taxonomy - Cognitive

## ► Knowledge:

- describes; enumerates; identifies; labels; lists; matches; names; reads; records; reproduces; states.

## ► Comprehension:

- classifies; cites; converts; estimates; explains; generalizes; gives examples; illustrates; makes sense out of; paraphrases; restates (in own words); summarizes; traces.

## ► Application:

- applies; assesses; charts; collects; computes; constructs; contributes; demonstrates; extends; implements; includes; informs; instructs; projects; solves; teaches; transfers; uses.

# Bloom's Taxonomy - Cognitive

## ► Analysis:

- analyzes; categorizes; compares; contrasts; correlates; differentiates; discriminates; distinguishes; infers; prioritizes.

## ► Synthesis:

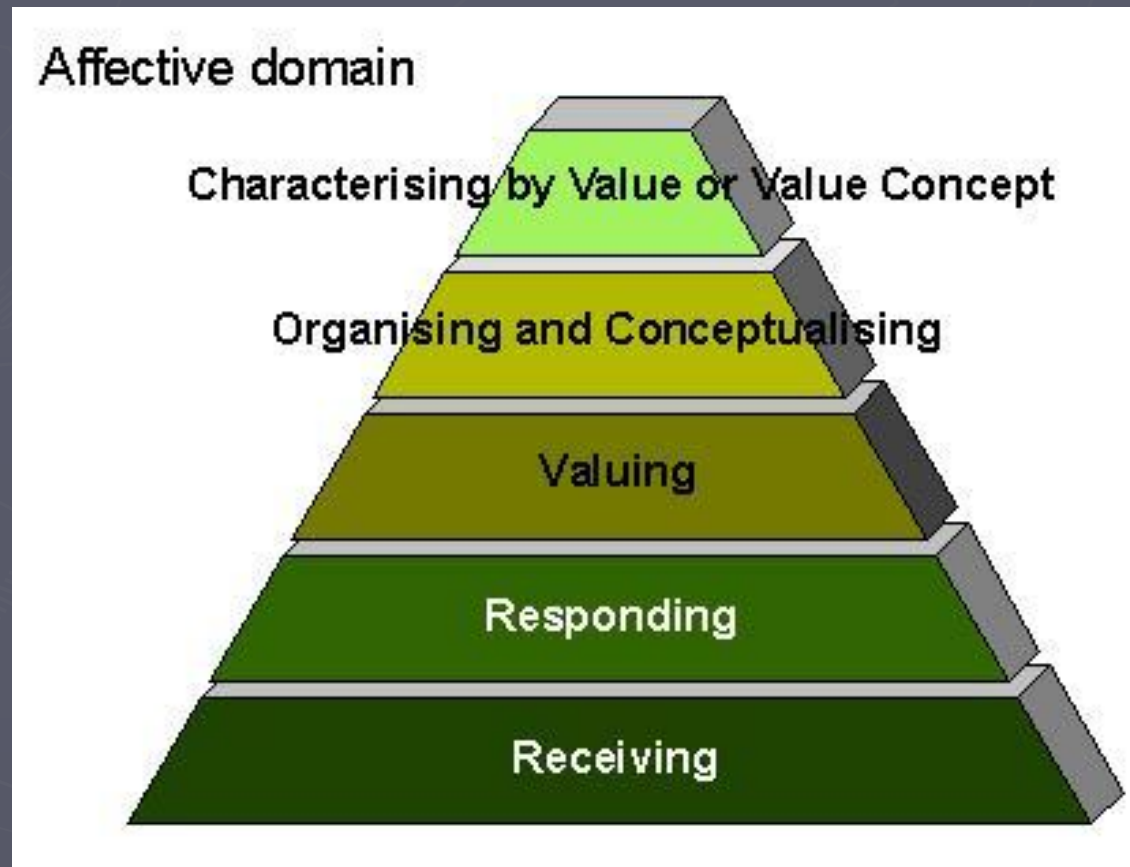
- adapts; composes; designs; facilitates; formulates; generates; hypothesizes; incorporates; integrates; invents; models; negotiates; plans; validates.

## ► Evaluation:

- appraises; compares & contrasts; concludes; criticizes; critiques; decides; defends; interprets; judges; justifies; reframes; supports.

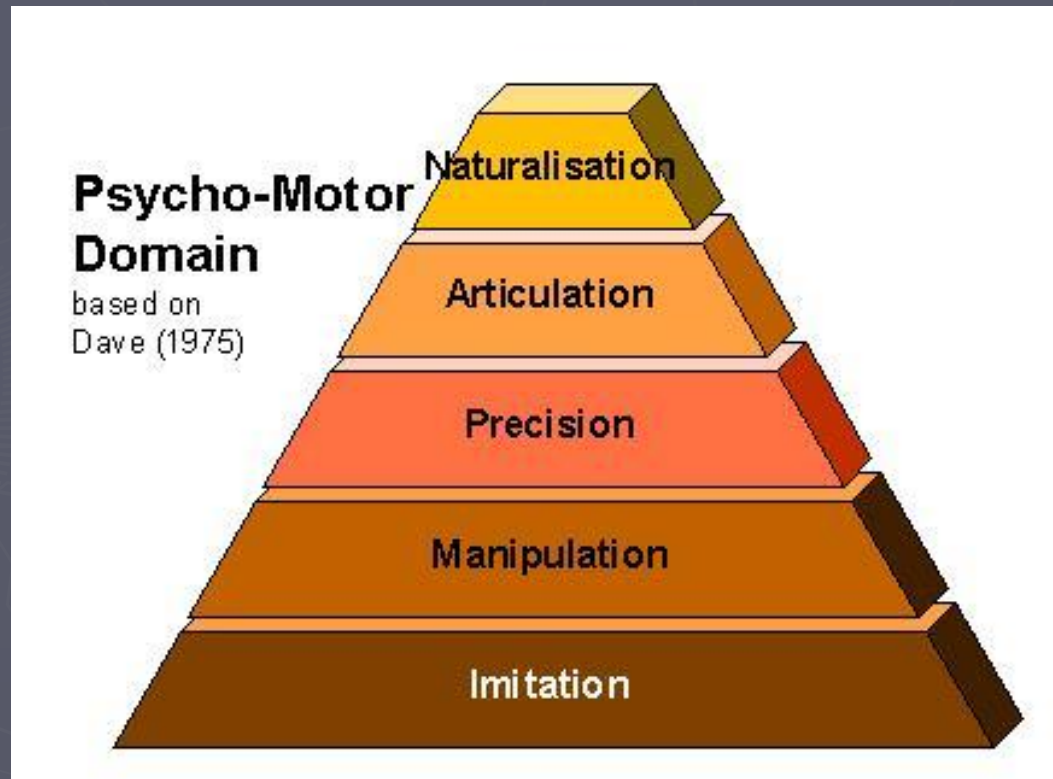
# Bloom's Taxonomy – Affective Domain

- Includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes.



# Bloom's Taxonomy – Psycho-Motor

- Includes physical movement, coordination, and use of the motor-skill areas. Requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution.



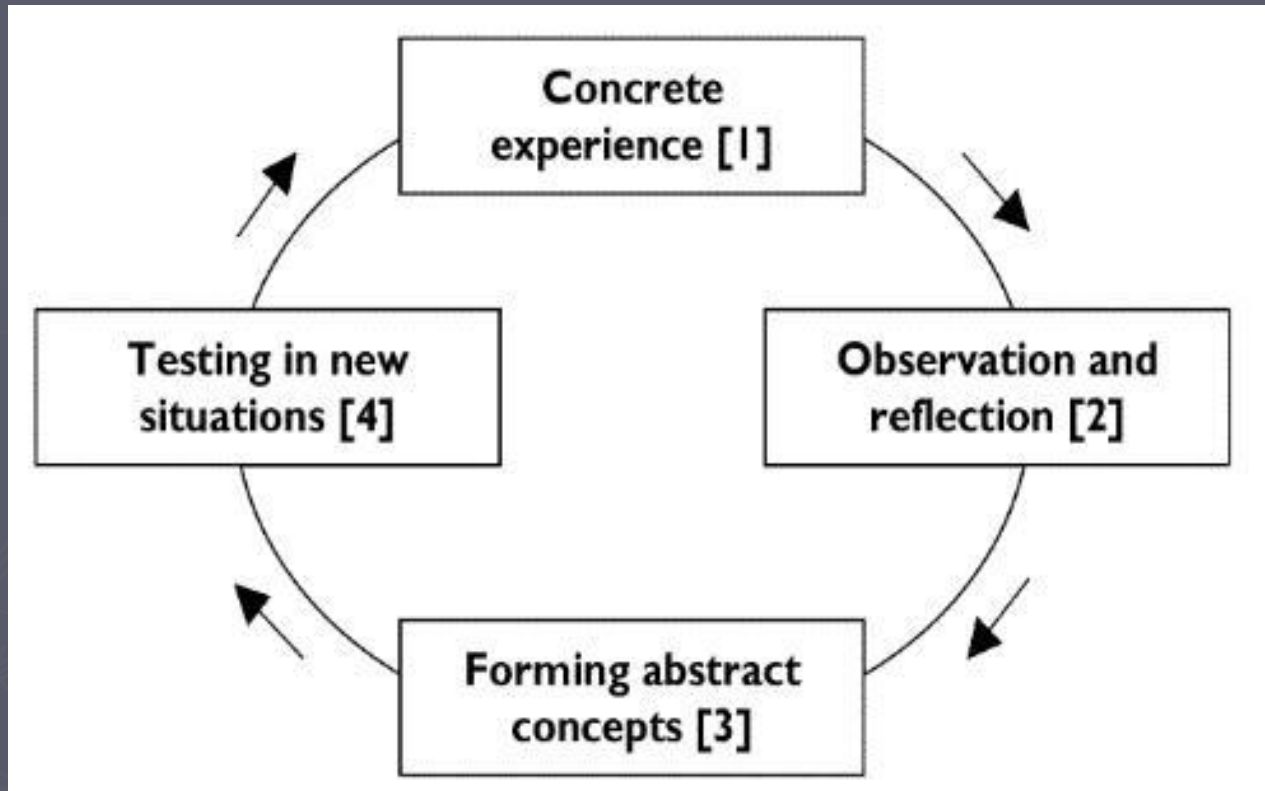
# Kolb's Experiential Learning Cycle

- ▶ Provides one of most useful descriptive models of adult learning process available.
- ▶ Not sufficient simply to have an experience in order to learn.
- ▶ Without reflecting upon this experience it may quickly be forgotten or its learning potential lost.
- ▶ It is from the feelings and thoughts emerging from this reflection that generalisations or concepts can be generated.
- ▶ And it is generalisations which enable new situations to be tackled effectively.

# Kolb's Experiential Learning Cycle

- ▶ Similarly, if it is intended that behaviour should be changed by learning, it is not sufficient simply to learn new concepts and develop new generalisations.
- ▶ Learning must be tested out in new situations. Learner must make link between theory and action by planning for that action, carrying it out, and then reflecting upon it, relating what happens back to the theory.
- ▶ Not enough just to do, and neither is it enough just to think. Nor is it enough simply to do and think. Learning from experience must involve links between the doing and the thinking.

# Kolb's Experiential Learning Cycle

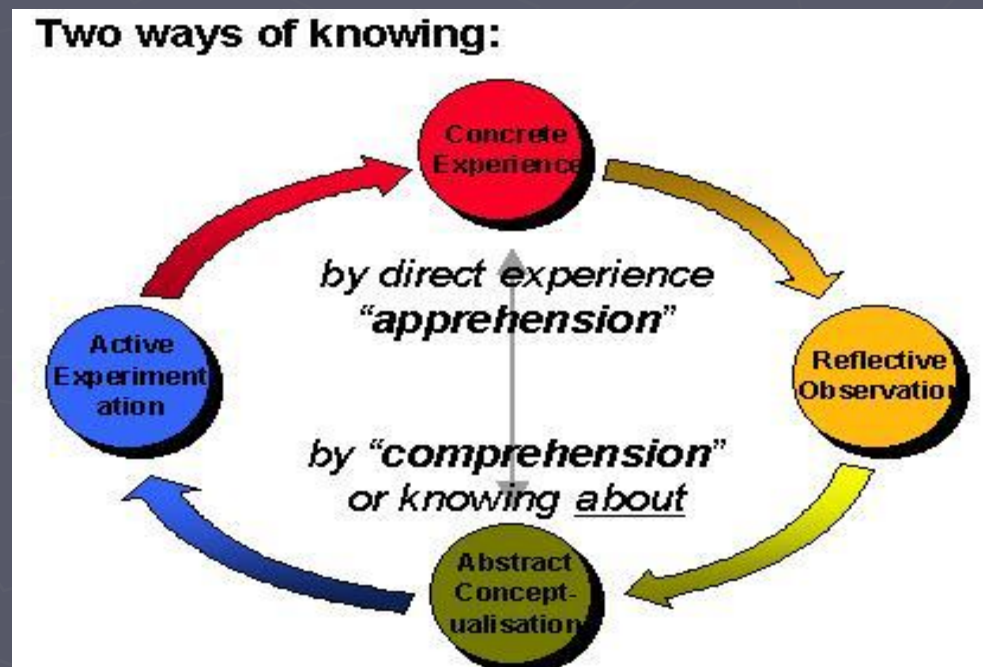


concrete experience (or "DO")  
reflective observation (or "OBSERVE")  
abstract conceptualization (or "THINK")  
active experimentation (or "PLAN")



# Kolb's Experiential Learning Cycle

- **Concrete Experience** corresponds to direct practical experience ("Apprehension") versus "knowledge about" something, which is theoretical but perhaps more comprehensive, (hence "Comprehension") and represented by **Abstract Conceptualisation**.



# Kolb's Experiential Learning Cycle

- ▶ **Reflective Observation** focuses on what the experience means to the experienter, (it is transformed by "Intension") or its **connotations**, while **Active Experimentation** transforms theory of Abstract Conceptualisation by testing it in practice (by "Extension") and relates to its **denotations**.

