

Learning and Memory

What is learning?

Dictionary definition:

- the acquisition of knowledge or skills through study, experience, or being taught.

Learning occurs when we are able to:

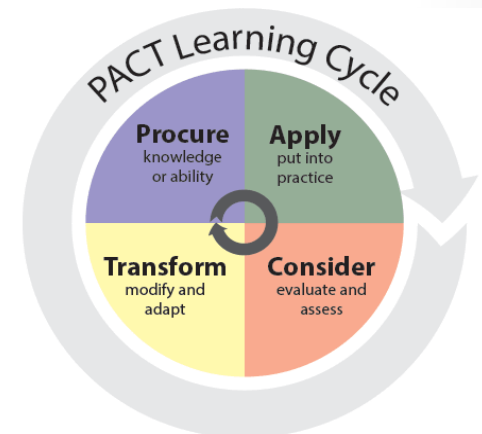
- Gain a mental or physical grasp of the subject.
- Make sense of a subject, event or feeling by interpreting it into our own words or actions.
- Use our newly acquired ability or knowledge in conjunction with skills and understanding we already possess.
- Do something with the new knowledge or skill and take ownership of it.

The PACT Learning Cycle

It is generally recognised that learning takes place in a repetitive cycle, an ongoing series of processes.

The PACT learning cycle stages are:

- **Procure.** New knowledge (theory) or ability (skill) is acquired.
- **Apply.** The new knowledge or skill is then practiced in some way.
- **Consider.** The results of the practice are evaluated and/or assessed.
- **Transform.** The original knowledge or ability is modified accordingly.
- **The cycle then continues and repeats.**



What types of things can you remember?

- Facts?
- Events?
- Processes?
- Skills?

Working Memory

Working memory should be seen as short term and finite, whereas long-term memory can be seen as infinite. The aim should be to move knowledge to long-term memory because when a student is exposed to new material, they can draw on this previous knowledge and the cognitive load is reduced.

Indications of working memory failures include:

- incomplete recall
- failing to follow instructions
- place-keeping errors
- task abandonment.

Memory

Write down three things that you remember clearly.

A life event.

A piece of information.

A process.

Think about how and why you remember them.

Types of Memory

Key Question: What will stay in children's memories?

- Conscious, intentional remembering of information eg Remembering a phone number, learning the times tables
- Unconscious recall eg Tina once visited a hotel with her parents when she was ten years old. She may not remember ever having been there, but when she makes a trip there later, she knows exactly how to get to the swimming pool.
- The recall of factual information such as dates, words, faces, events, and concepts. Remembering the capital of France, the rules for playing football.
- The recall of how to do things such as swimming or driving a car. (people don't have to consciously remember how to perform actions or skills).
- The memory of **experiences** and specific **events** in time in a serial form, from which we can reconstruct the actual events that took place at any given point in our lives. Individuals tend to see themselves as actors in these events, and the **emotional charge** and the entire **context** surrounding an event is usually part of the memory, not just the bare facts of the event itself.
- structured record of **facts, meanings, concepts** and **knowledge about the external world** that we have acquired. These memories may once have had a personal context, but now stand alone as simple knowledge. It therefore includes such things as types of food, capital cities, social customs, functions of objects, vocabulary, understanding of mathematics,

Why do we need to know this?

How can you apply this knowledge of memory in the classroom when you are teaching?

Ways to help pupils remember

more:

- always **connect** new learning to previous learning
- **revisit** learning frequently
- begin with a **model** (a complete example), gradually removing completed steps, which the learner will have to complete independently, and finally leaving just the to-be-solved problem.
- **Have practice tests or quizzes.** When students are given tests or quizzes that they're not graded on, they're able to review material in a low-stress environment (stress can undermine memory retention.)
- **Combine visual and verbal lessons.** Learning to use multiple senses helps increase retention. Showing students visual aids while teaching a lesson verbally helps to illustrate and cement the message for students.
- **Encourage and help students to develop memory "cues."** eg acronyms Richard of York Gave Battle In Vain or songs 4.
- **Discuss!** This will spark memories of what you had to say about the learning.
- **Give constructive comments** Each comment becomes another synaptic connection enforcing the "memory web" for a given concept or fact.
- **Review learning just before bedtime.** Research shows the information circulates in the mind during sleep, bolstering retention.

Cognitive Load

Cognitive Load Theory is based around the idea that our working memory – the part of our mind that processes what we are currently doing – can only deal with a limited amount of information at one time.

Reif's (Reif, 2010) description of cognitive load is extremely useful:

'The cognitive load involved in a task is the cognitive effort (or amount of information processing) required by a person to perform this task.'

How can we reduce cognitive load?

Why do we want to reduce it?

Discuss

How can we reduce it?

Suggest 3 ways.....

Reducing cognitive load

- **Intrinsic cognitive load** can be reduced by breaking down the subject content, sequencing the delivery so that sub-tasks are taught individually before being explained together as a whole. The idea is to not overwhelm a student too early on in the introduction of new work.

Reducing cognitive load

- **Extraneous cognitive load** can be reduced by the way in which instructions are presented. We make sense of new material by referencing schema or mental models of pre-existing knowledge. Lack of clarity in instruction puts too high a load on the working memory, and so too much time is spent problem-solving the instructions as opposed to new schema formation.

Avoiding Cognitive Load

For some pupils therefore:

- Don't read things out loud – avoid simultaneous oral and text presentation
- Break it down, further – pause for practice between individual problem types
- Example:problem pairs – give a worked example alongside an almost identical question
- Stop after five minutes – advise students never to spend more than five minutes trying to solve a homework problem

Vocabulary is Key

- Don't 'dumb down', explore root words and etymology.
- (Primarily from history) Ruler, king, monarch, monarchy, reign, democracy, election, tyranny, dictator, opposition, resistance, rebellion, invasion, conquest, triumph, parliament, government, tribe, emperor, empire, defeat, occupation, exploration, taxation, civilisation, citizen, culture, state, military, conflict, alliance, treaty, coalition, surrender, warrior, poverty, flee, exile, hostility, community, migration, persecution, oppression, liberation, neutral, eye-witness, source, archaeologist, expedition, navigation, exploration
- (Primarily from RE) Creation, gratitude, compassion, victim, sacrifice, sacred, holy, pagan, monotheism, polytheism, immortal, salvation, forgiveness, sin, incarnation, reincarnation, prophet, liberation, obedience, commandment, prayer, worship, wisdom, commitment, faith, belief

Oracy is Vital

- Make your home a talk-rich environment.
- Ask your child to teach you!
- Promote autonomy to get your child talking.
- Encourage enquiry for deep discussion with philosophy for children and debate.
- Use the power of pictures to prompt discussion.