



MARGE

A Whole-Brain Learning Approach for Students and Teachers



ARTHUR SHIMAMURA, PH.D.

This ebook (free to all) sets out 5 principles that should be applied to all stages of learning. Shimamura is a Professor of Psychology who specialises in memory and cognition.

@teacherhead.com have summarised these 5 principles in an easy to understand format.

We are going to look at each of these in turn.



PROFESSOR ARTHUR SHIMAMURA'S

A WHOLE-BRAIN LEARNING APPROACH FOR STUDENTS AND TEACHERS



MOTIVATE

We need to be motivated to use energy to keep focused on the learning process. Designed well, motivation can be intrinsic to learning, for example, by generating curiosity, framing new material as a quest to answer big questions, organising ideas within a wider schema, story-telling and asking the 'aesthetic question': *"What do you think? How does it make you feel? Why is it good?"* *"The aesthetic question engages emotional brain circuits and forces us to attend to and organize our knowledge."*



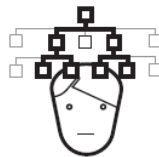
ATTEND

Academic learning is a 'top-down' activity whereby we consciously attend to the information needed to build our schema from all the stimuli we're exposed to. This is hard so 'mind wandering' is common and teachers need to expect it. Ideally students will consciously attend to the learning goals and consciously make connections – but sometimes an instructor needs grab attention, acting as their students' prefrontal cortex to direct their top-down processing.



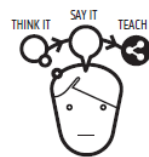
RELATE

Shimamura offers numerous biological insights about how we store and connect information through memory consolidation. The practical strategies include deploying elaborative-interrogative questioning – asking how and why – using mental images, analogies, constructing concept maps as schematic representations of sets of connected ideas and training students to make notes organised in hierarchical structures.



GENERATE

Shimamura suggests: *"Think it, say it, teach it! These are the simplest things to do to improve your memory"*. He details multiple ways in which our memories are strengthened when we generate information from our memory, not simply restating it but using our own words. If we tell someone what we've learned we can improve our memory by 30-50%. Explained in terms of brain functions, Generate reinforces the widely known retrieval practice concept.



EVALUATE

This is the territory of metacognition with a nice metaphor of the prefrontal cortex acting as the conductor of the orchestra of brain functions. There's a problem with the illusion of knowing when we are familiar with information even when we cannot fully recollect it. We stop trying to learn more if we kid ourselves into thinking we already know it. Students should, therefore, be taught to check their understanding using spaced retrieval practice, generating information by explaining their learning to others as a form of self-test.





MOTIVATE

To learn anything we have to be:

motivated

engaged

interested

curious



MOTIVATE

We need to be motivated to use energy to keep focused on the learning process. Designed well, motivation can be intrinsic to learning, for example, by generating curiosity, framing new material as a quest to answer big questions, organising ideas within a wider schema, story-telling and asking the 'aesthetic question': *"What do you think? How does it make you feel? Why is it good?"* *"The aesthetic question engages emotional brain circuits and forces us to attend to and organize our knowledge."*





ATTEND



A

ATTEND

We need to **attend** to relevant facts and information. Simply put this means we need to be **active** participants in the classroom and not passive.

Shimamura tells us that the 'nemesis of efficient student learning is mind wandering'!

As teachers we need to break up learning into chunks, we need to 'grab attention' and deliberately re-focus at various key points in the lesson.

Academic learning is a 'top-down' activity whereby we consciously attend to the information needed to build our schema from all the stimuli we're exposed to. This is hard so 'mind wandering' is common and teachers need to expect it. Ideally students will consciously attend to the learning goals and consciously make connections – but sometimes an instructor needs grab attention, acting as their students' prefrontal cortex to direct their top-down processing.



Summary taken from
[@teacherhead.com](https://www.teacherhead.com)



RELATE

We need to **relate** new information to what we already know. Simply put we need to be create **links** between this new knowledge and our existing knowledge. **So 'relate it and make it stick'**

How do we do this?

Acronyms

3 C's - categorise, compare, contrast

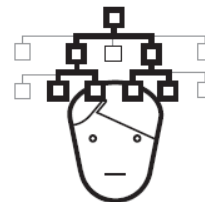
Relate it things we already know – make analogies, use metaphors

Create hierarchical organisations
concept maps



RELATE

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RELATE

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Things stick in our memory if we use the 3 C's:

3 C's:

Categorise

What other related information do you know that could help you here?

Compare

What similarities can you find with what you already know?

Contrast

What differences can you find with what you already know?

Create hierarchical organisations / **concept maps**

Classic memory study:

2 groups given 18 mins to learn a list

Group 1 random display of words

Group 2 words in a concept hierarchy

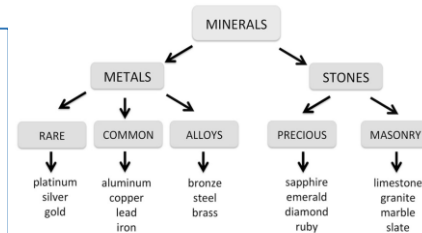
18% of words recalled vs 65% of words recalled

Reason – hierarchical organisations show links – we need to organise our information, categorise our information in order to remember it effectively.

Note taking is useful IF we have partial outlines or main headings/sub-headings etc.

We need to re-organise our class notes etc into these type of concept maps.

***recommended – no more than 5 outgoing links – 3-4 = best.**



Source: Bower et al. (1969)

Outline Format

I. MINERALS

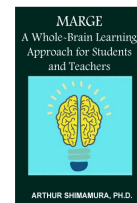
A. METALS

1. RARE

- a. platinum
- b. silver
- c. gold

2. COMMON

- a. aluminum
- b. copper
- c. lead
- d. iron





GENERATE

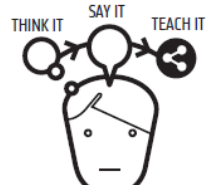


GENERATE

Shimamura suggests: *“Think it, say it, teach it! These are the simplest things to do to improve your memory”*. He details multiple ways in which our memories are strengthened when we generate information from our memory, not simply restating it but using our own words. If we tell someone what we’ve learned we can improve our memory by 30-50%. Explained in terms of brain functions, Generate reinforces the widely known retrieval practice concept.

When we **generate** information we improve our memory for that piece of information. Shimamura states that our ability to retrieve memories is as important as the initial learning process.

‘Think it, say it, teach it!’ – this is the easiest way to improve our memory. We need to be able to someone in our own words what we have learnt. If we can’t tell it in our words then we need to spend more time on the material. **By telling someone what we have learned our memory can improve by 30-50%.**



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When we **generate** information we improve our memory for that piece of information. Shimamura states that our ability to retrieve memories is as important as the initial learning process.

'Think it, say it, teach it!' We need to be able to someone in our own words what we have learnt. **By telling someone what we have learned our memory can improve by 30-50%.** We need to **ACTIVATE** what we've learned and consolidate

- No point spending hours re-reading your textbook or your notes – you need to do something with this. **CLOSE** the textbook and retrieve information from memory. This can more than double your retention compared to re-reading and highlighting.
- The more often you do this the better and space it out...
- Tell as many as people as possible what you've learned!
- Study groups can be really effective.

USE IT OR LOSE IT!

Robert Heinlein
'when one teaches, two learn'

If you're going to highlight **DON'T** highlight whole paragraphs / multiple sentences, highlight the important terms. Put notes in the margins etc.

'Study time' should be **'Test time'** – we need to be able to test ourselves on what we have learnt (low stakes testing).



EVALUATE



EVALUATE

We need to know what we know! (Posh term for this is metacognition!!). We need to **evaluate** our learning.

**‘Do not fall prey to the illusion of knowing’
(Shimamura)**

Hard core knowing or familiarity?

Hard core knowing – can we recollect / recall and explicitly explain – properly explain?

or

Is it just familiarity? We recognise the term or event etc BUT we can't explain it so we have the **illusion of knowing**.

This is the territory of metacognition with a nice metaphor of the prefrontal cortex acting as the conductor of the orchestra of brain functions. There's a problem with the illusion of knowing when we are familiar with information even when we cannot fully recollect it. We stop trying to learn more if we kid ourselves into thinking we already know it. Students should, therefore, be taught to check their understanding using spaced retrieval practice, generating information by explaining their learning to others as a form of self-test.



EVALUATE

**'Do not fall prey to the illusion of knowing'
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We need to know what we know! **Hard core knowing** or **familiarity**?

As **teachers** we need to sprinkle question and answer session throughout the lessons, we need to 'cold-call', we need to use open ended questions and also facts based questioning to double check you are listening and understanding.

As students you need to **monitor** yourselves:

- What can you remember about? Write it down. Check it. What have you missed?
- Go back to your notes, re-learn it, 3C's. concept maps etc...
- Create 4-6 key terms per topic. In your own words define/explain each one – create flashcards.




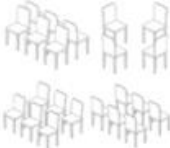





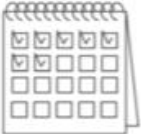


Space or delay the time between testing – minutes, hours, days, weeks.

Interleave (mix up) the testing – History – English – Biology – History – French – English...



Testing yourself repeatedly means strengthening the memory as you are establishing multiple pathways to the knowledge.

12 Recall Techniques

<p>1</p>  <p>Focus Your Attention Study in a distraction-free space</p>	<p>2</p>  <p>Elaborate Encode, read details, then rehearse</p>	<p>3</p>  <p>Avoid Cramming Think spaced 'over time' not last minute</p>	<p>4</p>  <p>Unfamiliar Put new information to things you know</p>
<p>5</p>  <p>Organise Group concepts into similar categories</p>	<p>6</p>  <p>Visualise Draw sketchnotes, charts or maps</p>	<p>7</p>  <p>Mnemonics A text or imagery technique</p>	<p>8</p>  <p>Read Loud Improves your memory of material</p>
<p>9</p>  <p>Pay Attention Order information to help structure</p>	<p>10</p>  <p>Vary Study Routine Different location, time and technique</p>	<p>11</p>  <p>Movement Moving activates our neurons; stand up!</p>	<p>12</p>  <p>Sleep Helps memory formation and recall</p>