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Designing for Memory

Working Memory (WM)

Long-term memory (LTM)

Patti Shank PhD
www.pattishank.com

Memory is complex.

And...

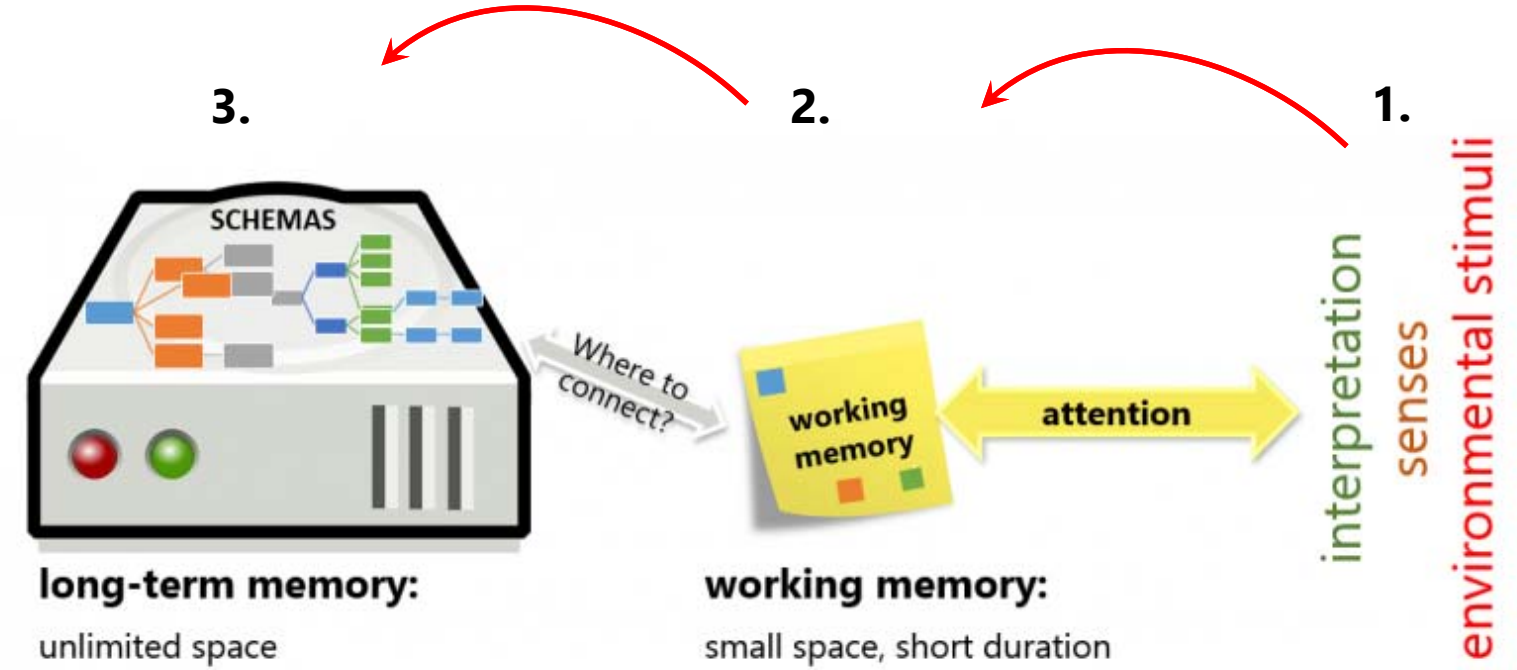
memory is critical to learning.

Implications for building and delivering instruction?

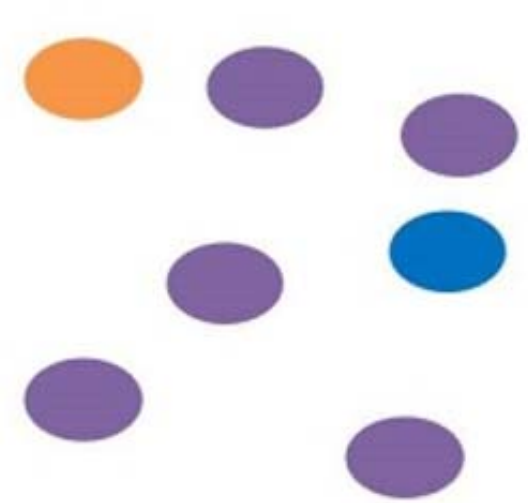
Session Topics

1. How memory works in learning
2. Implications of memory constraints
3. (Evidence-based) Tactics for designing instruction
4. Application discussion

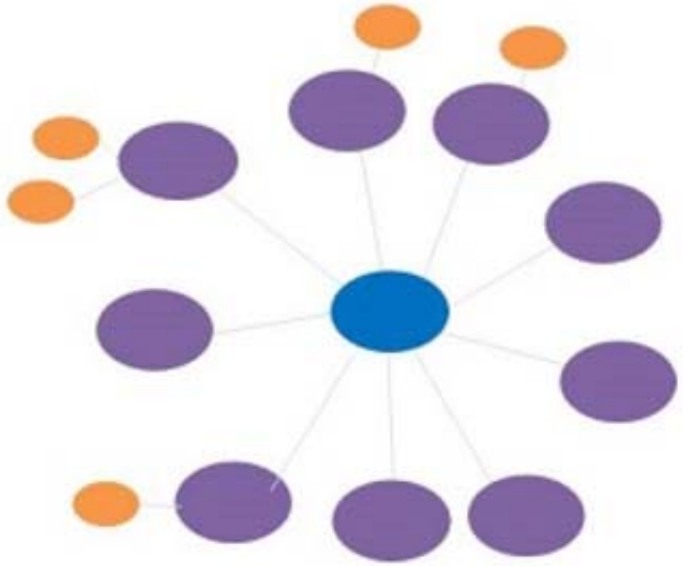
1. How memory works in learning



LTM and Schemas



People newer to a topic area don't have organized schemas. They have unorganized bits of information.



As people gain expertise in a topic, their schemas become organized. This organization enables them to organize new information more easily.

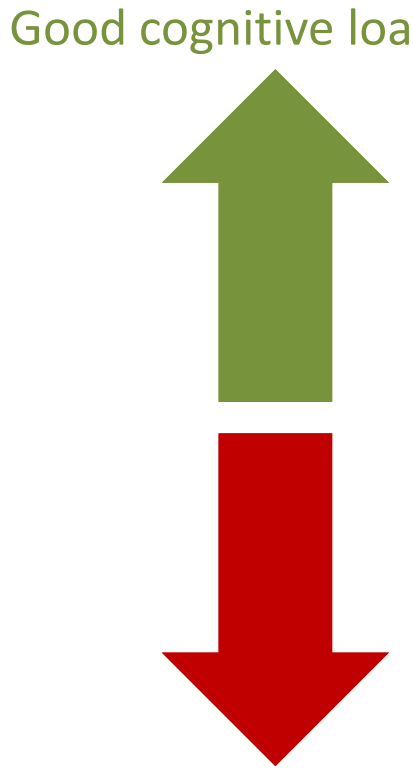
Cognitive Load (Mental Effort)

Mental effort that helps people learn, remember, and apply:

1. Examples
2. Problems
3. Practice
4. Feedback

Mental effort that makes it harder to learn, remember, and apply:

1. Too much content
2. Unnecessary images
3. Unclear language and organization
4. No activities or practice (to get to LTM)



We can effectively train large amounts of new content at a time. (Select the best answer.)

A. Yes

B. No

Type A or B into CHAT

We can effectively train large amounts of new content at a time. (Select the best answer.)

A. Yes

B. No

Why is memory a major constraint on learning? (Select the best answer.)

A. Working memory can only process and hold a few things at a time.
B. Long-term memory can only hold information for a short time.
C. Our memory systems are not built to remember.

Type A, B, or C into CHAT

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Why is memory a major constraint on learning? (Select the best answer.)

A. Working memory can only process and hold a few things at a time.

B. Long-term memory ~~can only~~ holds information for a ~~short~~ long time.

~~C. Our memory systems are not built to remember.~~

2. Implications of memory constraints

Implications of memory constraints: WM

1. We should not overload _____.
2. When we overload WM, learning is _____.
3. We should cut _____ content.
4. We need to help people figure out what is most important.

Type question # and answer into CHAT

Implications of memory constraints: WM

1. We should not overload **WM**.
2. When we overload WM, learning is **decreased or stopped**.
3. We should cut **less valuable** content.
4. We need to help people figure out what is most important.

Type question # and answer into CHAT

Implications of memory constraints: LTM

1. We should help people process content (in the context of the job) so it makes it from WM to _____.
2. We need to check understanding because _____.
3. Teach novices and experts _____.

Type question # and answer into CHAT

Implications of memory constraints: LTM

1. We should help people process content (in the context of the job) so it makes it from WM to **LTM**.
2. We need to check understanding because **misunderstandings make it difficult to connect new dots.**
3. Teach novices and experts **differently.**

3. Tactics for designing instruction

Tactics: Design *for* human cognitive architecture, not *against* it

Tactic 1: Don't overload content.

Tactic 2: Prefer clear and concise over imprecise and wordy.

Tactic 3: Connect to the needs of the job.

Tactic 4: Check for understanding and clear up misunderstandings.

Tactic 5: Ask people to summarize.

Tactic 6: Support memory (job aids, remembering activities, organization)

Tactic 2: Prefer clear and concise over imprecise and wordy. From: Write and Organize for Deeper Learning

Before (68 words)	**After** (18 words
After notification of NMFS, this final rule requires all CA/OR DGN vessel operators to have attended one Skipper Education Workshop after all workshops have been convened by NMFS in September 1997. CA/OR DGN vessel operators are required to attend Skipper Education Workshops at annual intervals thereafter, unless that requirement is waived by NMFS. NMFS will provide sufficient notice to vessel operators by mail prior to convening workshops..	After notification from NMFS, vessel operators must attend a skipper education workshop before commencing fishing each fishing season.

http://www.plainlanguage.gov/examples/before_after/regfisheries.cfm)

Tactic 5: Ask People to summarize

Instructions: In your own words, summarize how memory impacts learning.

Instructions: Which of the following sentences as NOT an accurate point about memory and learning? (Select the best answer.)

A. Working memory processes all information coming in from the senses.
B. We must design to not overwhelm WM.
C. The storage capacity of LTM is thought to be unlimited.
D. One purpose of instruction is to help people form accurate schema.

Tactic 5: Ask People to summarize

Instructions: In your own words, summarize how memory impacts learning.

Instructions: Which of the following sentences is **NOT** an accurate point about memory and learning? (Select the best answer.)

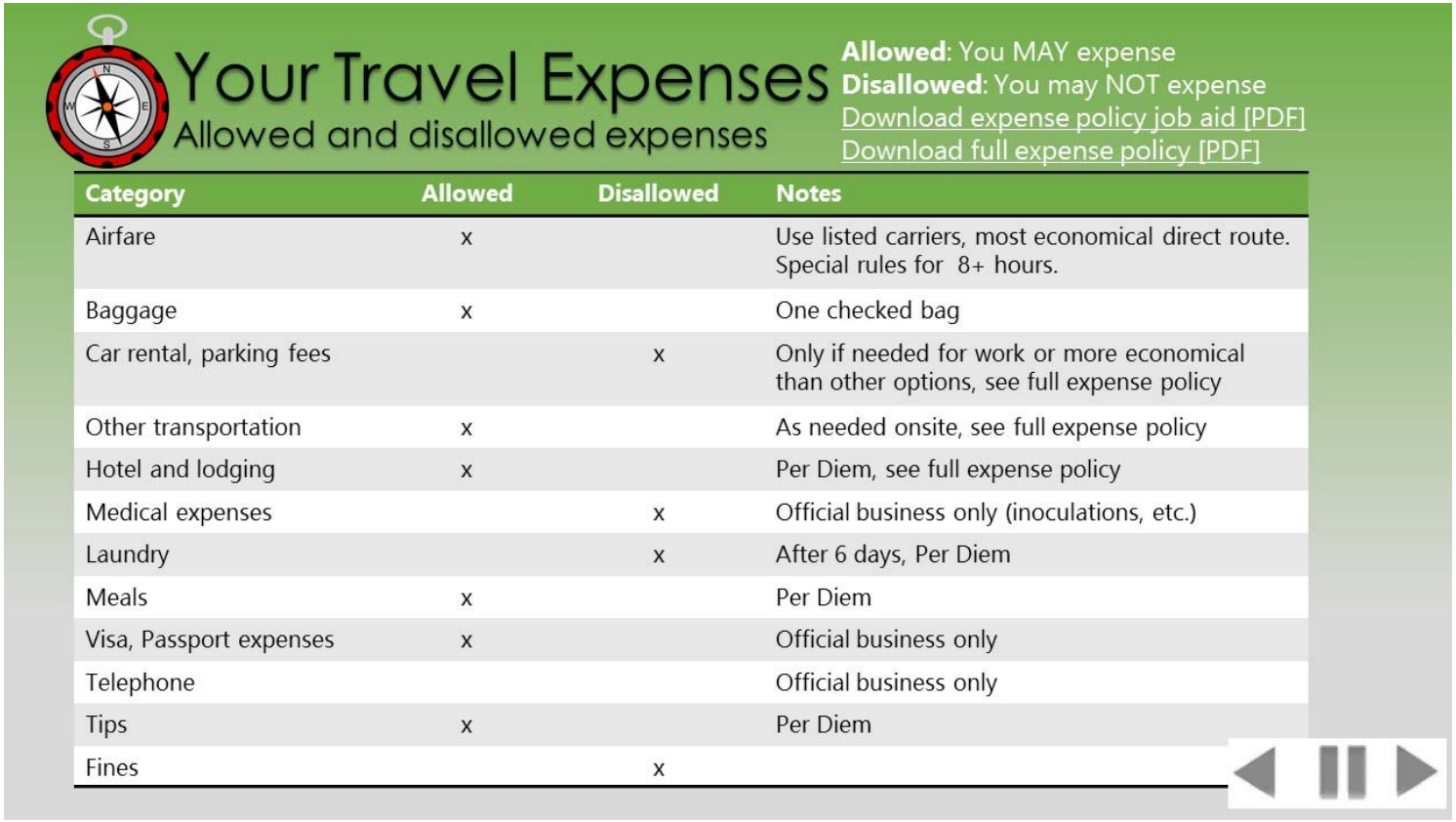
A. Working memory processes all information coming in from the senses.

B. We must design to not overwhelm WM.

C. The storage capacity of LTM is thought to be unlimited.

D. One purpose of instruction is to help people form accurate schema.

Tactic 6: Support memory.



Your Travel Expenses

Allowed and disallowed expenses

Allowed: You MAY expense
Disallowed: You may NOT expense
Download expense policy job aid [PDF]
Download full expense policy [PDF]

Category	Allowed	Disallowed	Notes
Airfare	x		Use listed carriers, most economical direct route. Special rules for 8+ hours.
Baggage	x		One checked bag
Car rental, parking fees		x	Only if needed for work or more economical than other options, see full expense policy
Other transportation	x		As needed onsite, see full expense policy
Hotel and lodging	x		Per Diem, see full expense policy
Medical expenses		x	Official business only (inoculations, etc.)
Laundry		x	After 6 days, Per Diem
Meals	x		Per Diem
Visa, Passport expenses	x		Official business only
Telephone			Official business only
Tips	x		Per Diem
Fines		x	

From: Write and Organize for Deeper Learning

Tactic 6: Support memory.

Things possibly needing initial memory support	Things possibly needing ongoing memory support
• The four steps for getting expenses reimbursed • Allowed and disallowed expenses • The hotels with which the company has discounts	• The codes to enter for the different hotel chains and airlines • The sites, names, and phone numbers of who to contact if you have problems with reimbursement

From: Write and Organize for Deeper Learning

Tactic 5: Check for misunderstandings.

Questions	Activities
Can you expense telephone calls while traveling for business? (Select the *best* answer.) A. Yes, if they are business-related B. Yes, if they fall under per diem amount C. Only if company cell phone cannot be used	Here are the receipts from Stella's trip from the home office to the Norfolk, VA office. File an expense report for these expenses, using the expense rules.

From: Write and Organize for Deeper Learning

4. Application discussion

Tactic 1: Don't overload content.
Tactic 2: Prefer clear and concise over imprecise and wordy.
Tactic 3: Connect to the needs of the job.
Tactic 4: Check for understanding and clear up misunderstandings.
Tactic 5: Ask people to summarize.
Tactic 6: Support memory (job aids, remembering activities, organization)

Pick a tactic and describe how to use it in CHAT

My take…

Tactics	How to use
Tactic 1: Don't overload content.	Stick very closely to needed content. Don't add extra content that is not strictly needed.
Tactic 2: Prefer clear and concise over imprecise and wordy.	Be merciless when editing the content. Pretend you must cut it by half.
Tactic 3: Connect to the needs of the job.	How does the content impact audience jobs? Should different jobs be made aware of different information?
Tactic 4: Check for understanding and clear up misunderstandings.	Build exercises that find and fix misunderstandings.
Tactic 5: Ask people to summarize.	Special case of Tactic 5.
Tactic 6: Support memory (job aids, remembering activities, organization)	Find out what people need to remember and how you can support memory. For this content: job aids, special exceptions.

References

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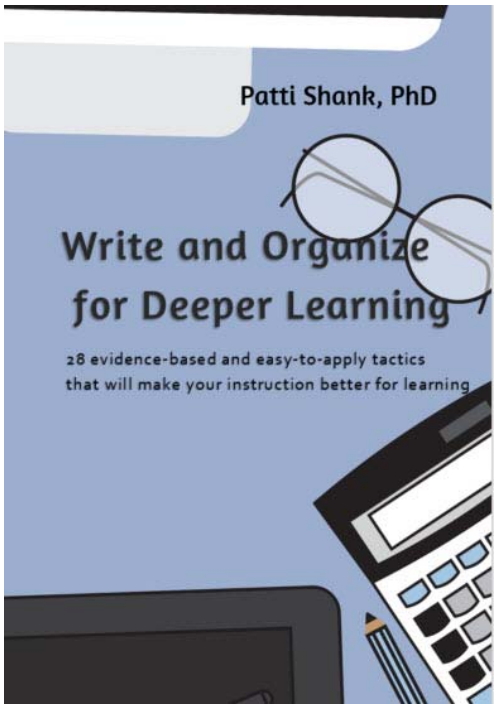


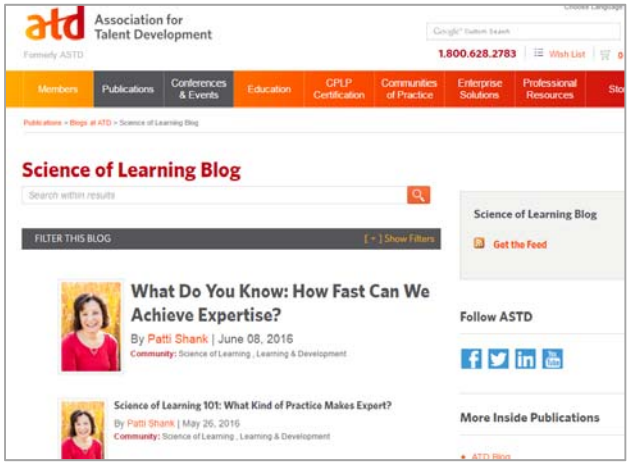
https://www.amazon.com/Write-Organize-Deeper-Learning-apply-ebook/dp/B072NZFBMZ

Contact info:

patti@pattishank.com

www.pattishank.com

Twitter: @pattishank



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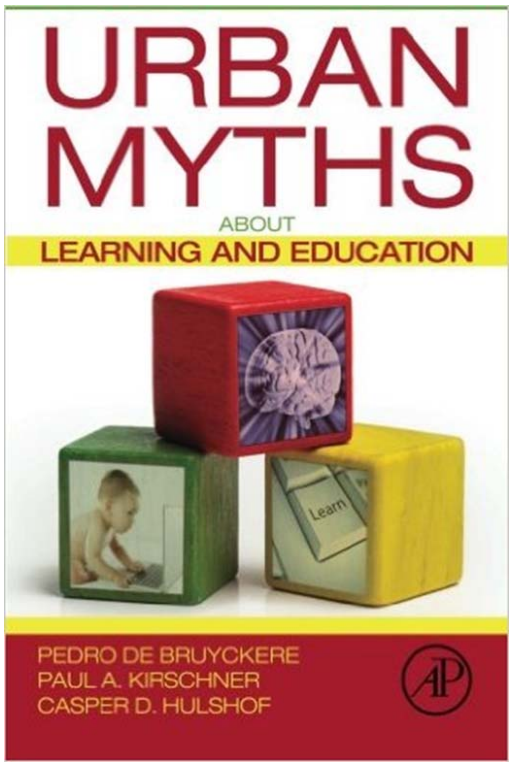

https://www.amazon.com/Urban-Myths-about-Learning-Education/dp/0128015373/

Reach out:
www.pattishank.com
patti@pattishank.com
@pattishank.com