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Cognitive Load Theory and Designing Workplace Activities

# Objectives

- What is cognitive load theory?
- How could this effect learning in the workplace?
- How can I redesign an activity using CLT?

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# What is Cognitive Load Theory

The theory that an individual only has a limited volume of cognitive resource and that exceeding this volume resource demand beyond an individual's capacity can compromise learning and the successful execution of a task.



Sweller, J. Cognitive load during problem solving: Effects on learning. Cogn. Sci. 1988;12:257-285

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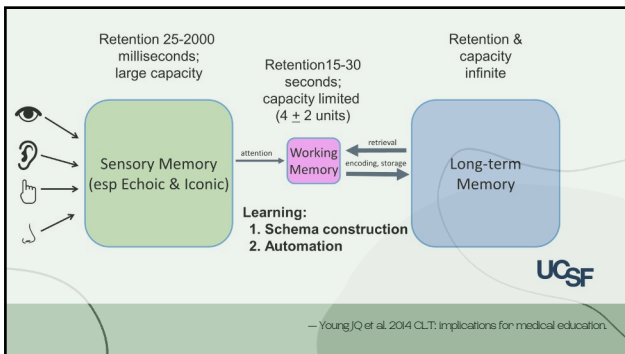
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### Three Types of Cognitive Load



<b>Intrinsic Load</b> task complexity learner knowledge	<b>Extraneous load</b> internal and external distractions; learning environment	<b>Germane Load</b> learner effort; metacognition
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Sweller, J., van Merriënboer, J. J. L. S., Paas, F. G. (1998). Cognitive architecture and instructional design. Educational Psychology Review, 10, 253-296.

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### Three Types of Cognitive Load



<b>Intrinsic Load</b> task complexity learner knowledge	<b>Extraneous load</b> internal and external distractions; learning environment	<b>Germane Load</b> learner effort; metacognition
<b>MATCH</b>	<b>MINIMIZE</b>	<b>OPTIMIZE</b>

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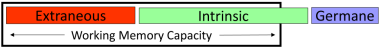
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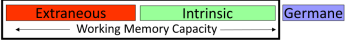
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### Interaction of Cognitive Load with Working Memory Capacity

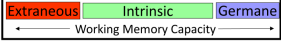
**A. Early Learner or New Experience or Equipment**




**B. Intermediate Learner or some Experience**



**C. Intermediate Learner with reduced interruptions**



Young JD et al. Unpacking the Complexity of Handoffs with CLT: Teaching and Learning in Medicine, 2016.



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## PAUSE

Can you think of situations where you can apply cognitive load theory to your learners?

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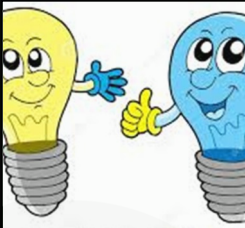
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## PAUSE

Can you think of situations where you can apply cognitive load theory to your learners?

Discuss in pairs. Share with the group.

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## Workplace Teaching: Match Intrinsic Load

- Ask about the learner's level of knowledge, experience, and areas for focus
- Choose appropriate tasks—not so simple to bore and not so complex to frustrate
- Manage complexity by decreasing multiple simultaneous tasks
- Acknowledge that even prepared learners may be overwhelmed by other intrinsic demands
- Difficult to control intrinsic load of workplace (e.g., case complexity)
- Learners are not the only stakeholders!

Sewell, J et al 2019 Cognitive load theory for training health professionals in the workplace: A BEME review of studies among diverse professions

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**Workplace Teaching: MINIMIZE EXTRANEOUS Load**

- Orient learners
- Decrease distractions and disruptions
  - Tangential conversation
  - Relationships with team members
  - Music
- Recognize
  - Time pressure demands
  - Fatigue

Sewell, J et al 2019 Cognitive load theory for training health professionals in the workplace: A BEME review of studies among diverse professions

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**Workplace Teaching: OPTIMIZE GERMANE Load**

- Use the think-aloud strategy
- Have a time for learners to ask questions and explain
- Find a focus for each learner, regardless of team size
- Provide timely feedback
- Set time for reflection

Sewell, J et al 2019 Cognitive load theory for training health professionals in the workplace: A BEME review of studies among diverse professions

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How can you intentionally do this?

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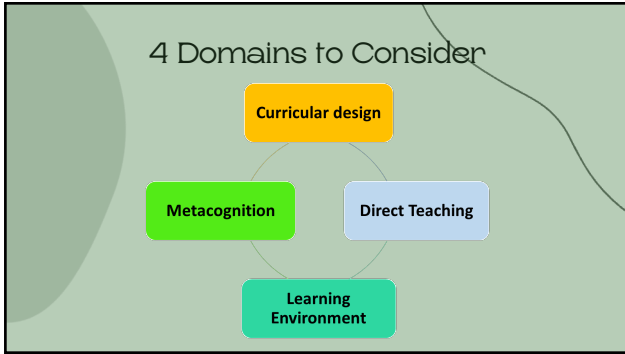
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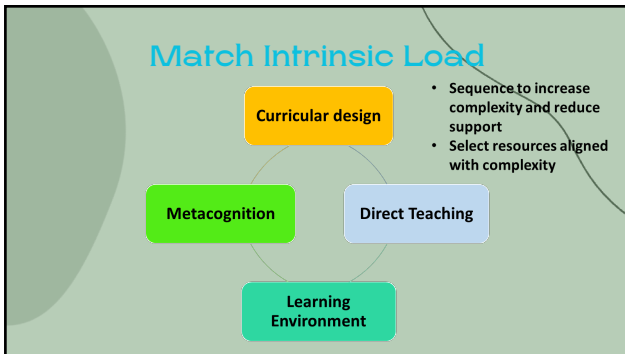
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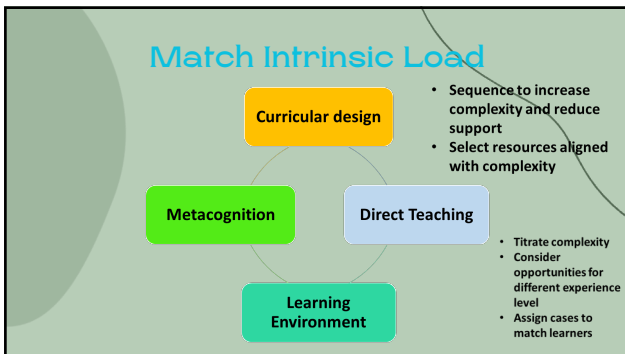
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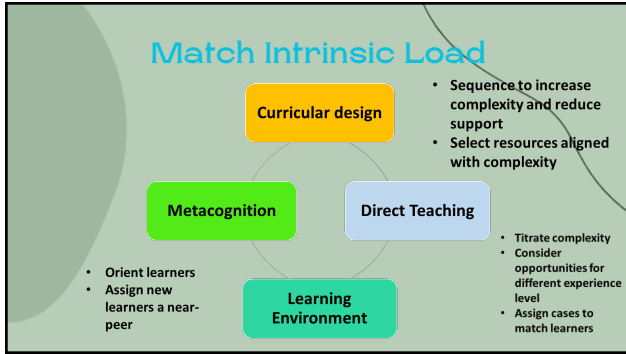
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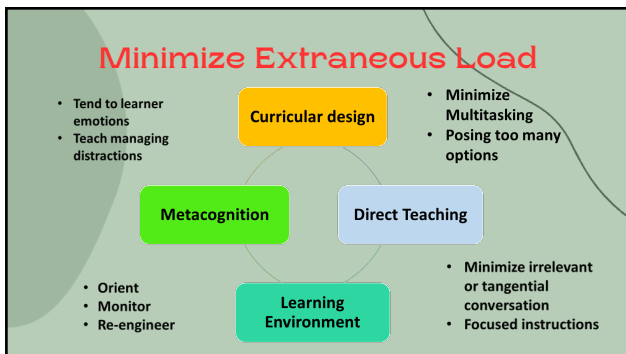
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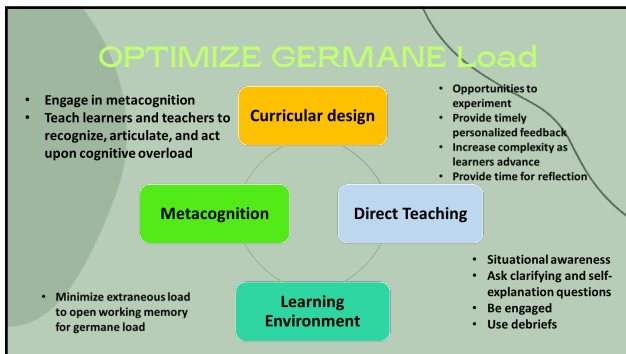
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### Let's apply CLT



"Does it come through?"

"Do the same thing with the other thing"

"Move it up that way"

"Suture from left to right"

"Thumb up or palm towards you"

Brian, R. et al. Ambiguity in robotic surgical instruction: lessons from remote and in-person simulation. *Adv in Health Sci Educ* (2025). <https://doi.org/10.1007/s10459-024-10458-1>

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### What type of CL?



"Does it come through?"

"Do the same thing with the other thing"

"Move it up that way"

"Suture from left to right"

"Thumb up or palm towards you"

**7.5 semantic ambiguities per minute**

Brian, R. et al. Ambiguity in robotic surgical instruction: lessons from remote and in-person simulation. *Adv in Health Sci Educ* (2025). <https://doi.org/10.1007/s10459-024-10458-1>

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# Let's apply the design framework

Curriculum  
What could we do?.

Teaching

Learning Environment

Metacognition

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# Activity 1

Review worked example

Discuss in group

Answer these questions

- What surprised you?
- What insights did you learn?
- How can you envision using these strategies?
- What questions do you have?

Version 1.0.0.0 | M.V. O'Sullivan, P.S. Young, J.G. Sewell, J.L. Using cognitive load theory to improve teaching in the clinical workplace. MedEdPORTAL. <https://www.medscape.com/viewarticle/937287>

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# Activity 2

What is an activity that you might like to think about redesigning based on applying cognitive load theory in the workplace?

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**Activity 2**

Use the worksheet to apply CLT to a problem of your own

Start with a section most interesting to you and complete others as time allows

Verkaaf M.V., O'Sullivan P.S., Young J.G., Gerwell J.L. Using cognitive load theory to improve teaching in the clinical workplace. MedEdPORTAL. <https://doi.org/10.1097/med.0000000000000000> 2022. 05(5):00000.

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**Revisit the Heart**

Intrinsic load

Extraneous load

Germane Load



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**Thank you!**

apply CLT to help in the workplace

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