

Cognitive Load Theory

Principles for application in classrooms
and virtual environments.



Supporting resource to the presentation facilitated by
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engage
learning &
development

Cognitive Load Theory Principles

Below are several (but not all) principles of Cognitive Load Theory. I have only included the principles discussed in the presentation, 'Cognitive Load Theory: Principles for application in classrooms and virtual environments'.

1. Coherence Principle

People learn better when extraneous material is excluded.

Examples:

- Keep graphics and images relevant to the content.
- Remove decorative images and replace with images that have direct, metaphorical or analogous relevance.
- **Curate your content** and limit the amount of text in instructional documents to only essential information.
- Remove unnecessary animation in your slides or eLearning material.
- See Appendix A for a graphical demonstration of this principle.

Design, not decoration.

While it is important to make your designs aesthetically pleasing, avoid irrelevant images and graphics.

Include graphics that are either directly relevant or have analogous or metaphorical coherence with your topic.

2. Signalling Principle

People learn better when cues that highlight the essential material are added.

Examples:

- Use **bold**, *italics* and CAPITAL LETTERS sparingly and strategically.
- Use graphical cues to highlight key points.
- Use height and size of text to highlight key points on a page, slide or screen.
- Avoid making the heading of your slide or screen the largest text size.

3. Redundancy Principle

People learn better from images and narration than from images, narration and on-screen text.

Examples:

- Use PowerPoint as it is intended and eliminate text-heavy slides.
- Don't read directly from your slides.
- If you show text (such as a quote), allow people time to read it before you speak.
- Remove on-screen text in eLearning programs and replace with narration where possible.

4. Spatial Contiguity Principle

People learn better when corresponding printed words and graphics are placed near rather than far from each other on the page or screen.

Examples:

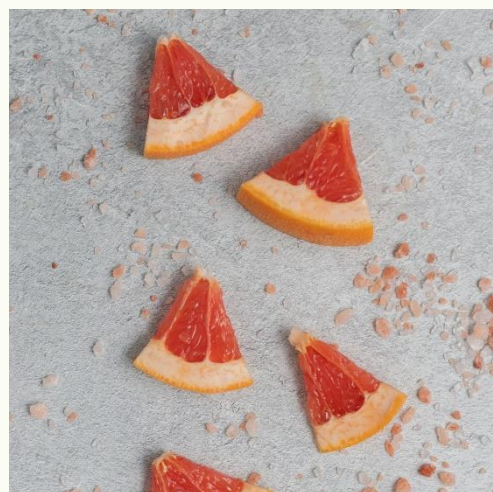
- Put advice in text boxes within or close to the diagram or image.
- See Appendix A for a graphical demonstration of this principle.

5. Segmenting Principle

People learn better when content is presented in learner-paced segments rather than as a continuous unit.

Examples:

- Break down your content or topic rather than training it as a whole.
- Have learners master each part before integrating all the elements.
- Break down assessment tasks into manageable tasks.
- Provide assessment instructions in a segmented way (macro to micro).
- Apply the basic design structure to your learning events.



Break complex content down into **parts** and train each part individually. Once learners have mastered each part, **integrate them into a whole**.

6. Multimedia Principle

People learn better from words and pictures than from words alone.

Examples:

- Avoid text overload.
- Avoid irrelevant images (see Principle 1)
- Remember if designing a webinar or eLearning program, narration and images are better than text and images or narration alone.

7. Pre-Training Principle

People learn better when they have had training in the names and characteristics of the main concepts.

Examples:

- Ensure learners have the right foundation.
- Have learners complete a short introduction via webinar or eLearning program several days before training a complex topic.

- Start with the simple and move to the complex.
- Take people through the overarching concepts first.

8. Personalisation Principle

People learn better when words are in conversational style rather than formal style

Examples:

- Use the words 'I' and 'you' when speaking and writing.
- Use 'you' in your assessment tasks.
- Relate your stories to the person e.g. 'Imagine you are...'

9. Worked Example Principle

People learn better when provided with worked examples at the beginning of their learning.

Examples:

- Very useful in complex domains with high element interactivity and where methods and processes must be applied.
- Develop scaled worked examples and use them in generative activities.
- Helpful to facilitate generative learning activities.

10. Self-Explaining Principle

People learn better when they attempt to self-explain concepts and integrate them into existing schema.

Examples:

- Works well with the Worked Example Principle.
- Useful in complex domains where there are existing methods and processes.
- Identify or show errors and explain why they are errors.
- Identify methods or techniques used in a worked example.

11. Generative Drawing Principle

People learn better when they create drawings of the meaning they have deduced from a text or learning event.

Examples:

- Get learners to read something and draw images explaining the key points in the text.
- Get learners to draw their key learnings from your event.

For further principles and research supporting CLT, see: Mayer, R. E. (2009). Multimedia learning (2nd ed.). Cambridge, England: Cambridge University Press.

Retrieval Activities.

If you have been to some of my programs in the past, you will know I often talk about the importance of retrieval after a learning event. So, in the week following the conference take a few minutes to complete the following activities.

Your brain will thank you for it!

Retrieval activity #1

Write down everything that you can remember about the Cognitive Load Theory and the principles for application. Draw some pictures and graphics of the key concepts.

[illegible]

Review your list and drawings and identify the three ideas that you think have most value to your work.

For each of the ideas you have listed above, write down where and when you intend to apply them.



Appendix A

Coherence Principle

Below is an example of a breach and adherence to the Coherence Principle.

Figure 1: Breach of the Coherence Principle.

In Figure 1 the image does not relate to the text above and is an example of decoration rather than design. As it is unrelated to the content, the image breaches the Coherence Principle and adds to extraneous cognitive load.

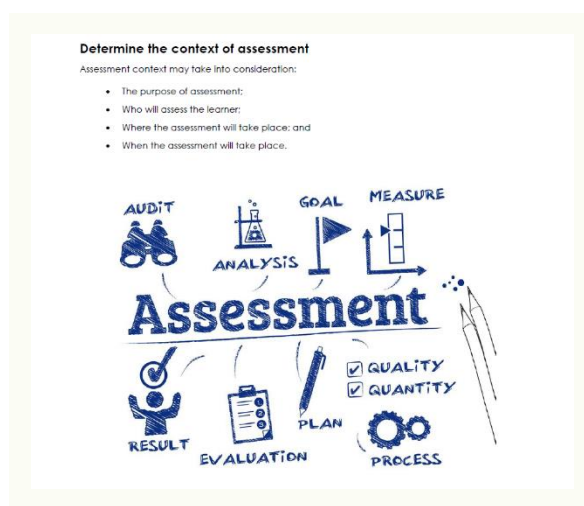
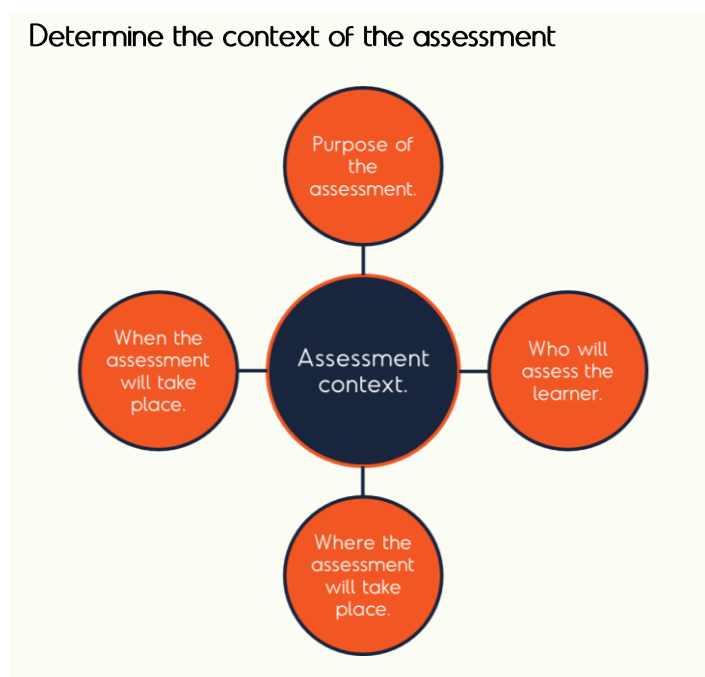


Figure 2: Adherence to the Coherence Principle.

Figure 2 provides an example of a simple graphic that communicates the text. Because a graphic has been used, it also adheres to the Multimedia Principle.



Spatial Contiguity Principle

Below is an example of a breach and adherence to the Spatial Contiguity Principle.

Figure 3: Breach of the Spatial Contiguity Principle.

In this image the explanation text is included below the image and continues over the next page. A breach of the Spatial Contiguity Principle, the design adds to extraneous cognitive load.

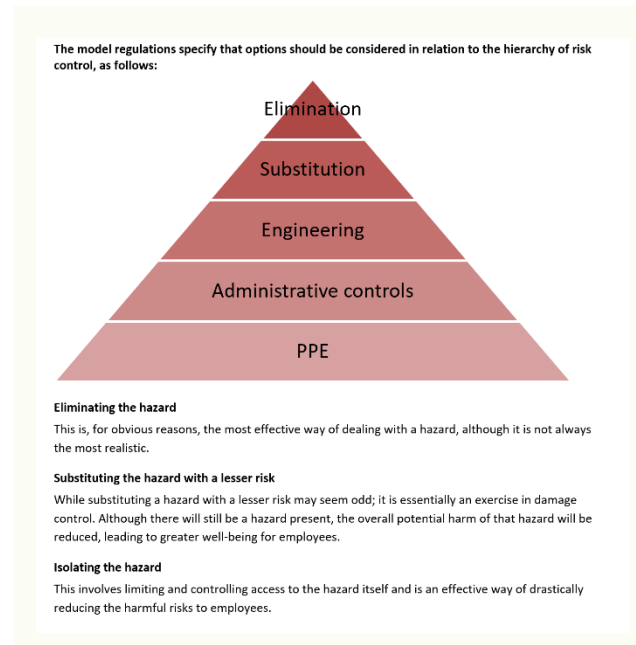
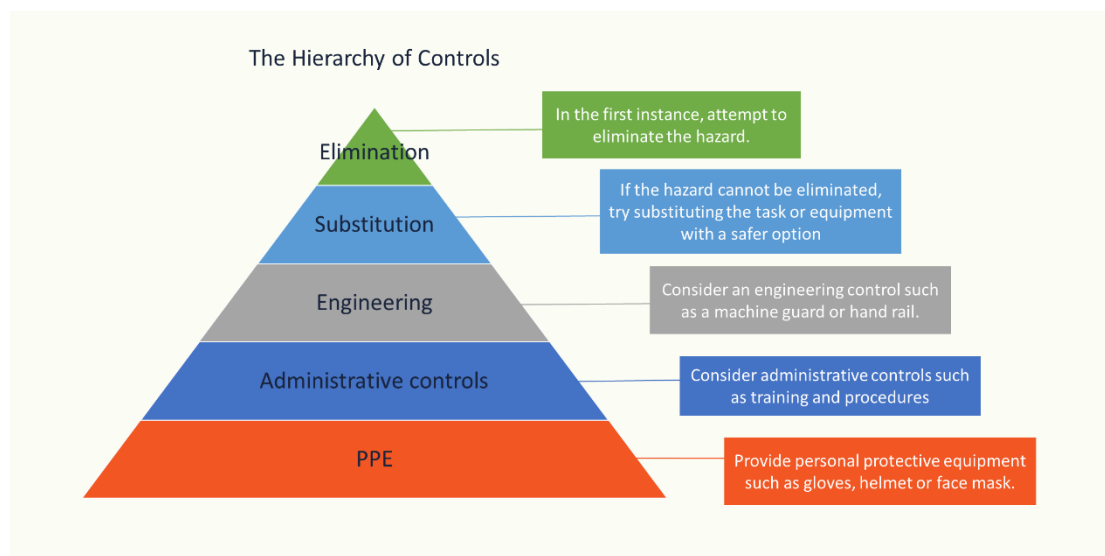


Figure 4: Adherence to the Spatial Contiguity Principle.

In this image the explanation text is included within the image, adhering to the Spatial Contiguity Principle, and reducing extraneous cognitive load.





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