Cognitive Load Theory: 
Implications for Instructional Design

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Information Processing Model

Axelrod, 1973
Working Memory

![Diagram of working memory]

**Fig. 8.** A revised model of working memory.

Baddeley, Allen, & Hitch, 2011

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### Schemas

- “A schema is a pre-existing assumption about the way the world is organized.” (Singer, 1968)
- Piagetian Schema Development:
  - Assimilation
  - Accommodation
Types of Cognitive Load

- **Intrinsic**
  - Addition, subtraction, multiplication, division
  - Element interactivity
  - Manage it

- **Extraneous (Irrelevant)**
  - Gamification, teamwork, online
  - Reduce it

- **Germane (Relevant)**
  - Schema construction
  - Increase it

Eight Principles of Cognitive Theory Applied to Multimedia Design

1. **Multimedia principle**
   - Deeper learning from pairing words and pictures

2. **Contiguity principle**
   - Deeper learning from presenting words and pictures simultaneously rather than sequentially

Mayer, 2002
Eight Principles of Cognitive Theory Applied to Multimedia Design

3. Coherence principle
   - Deeper learning when extraneous words, sounds, images are excluded

4. Modality principle
   - Deeper learning when words are presented as narration rather than as on-screen text

5. Redundancy principle
   - Deeper learning when words are presented as narration rather than as both narration and on-screen text

6. Personalization principle
   - Deeper learning when words are presented in conversational style rather than in formal style

Mayer, 2002
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7. Interactivity principle
   - Deeper learning when learners are allowed to control the presentation rate than when they are not

8. Signaling principle
   - Deeper learning when key steps in the narration are signaled rather than non-signaled

Mayer, 2002

Instructional Gold Standard

- Worked examples
- Diversity of examples
- Decompose complex tasks and support

Kirschner, Sweller, & Clark, 2006
References


References