Cognitive Load Theory:
Implications for Instructional Design

LESSEP 17-1

June 2-3, 2017

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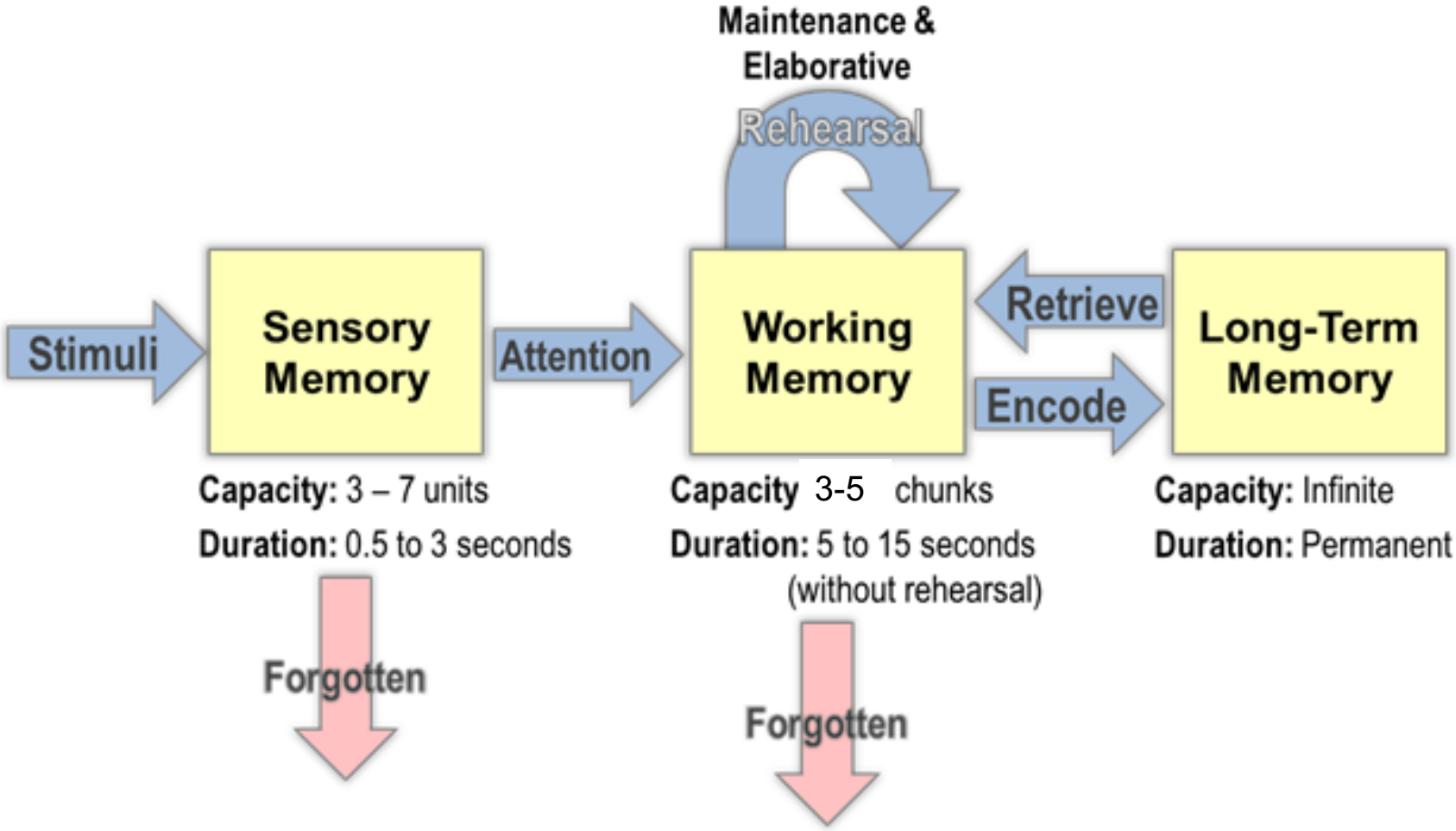
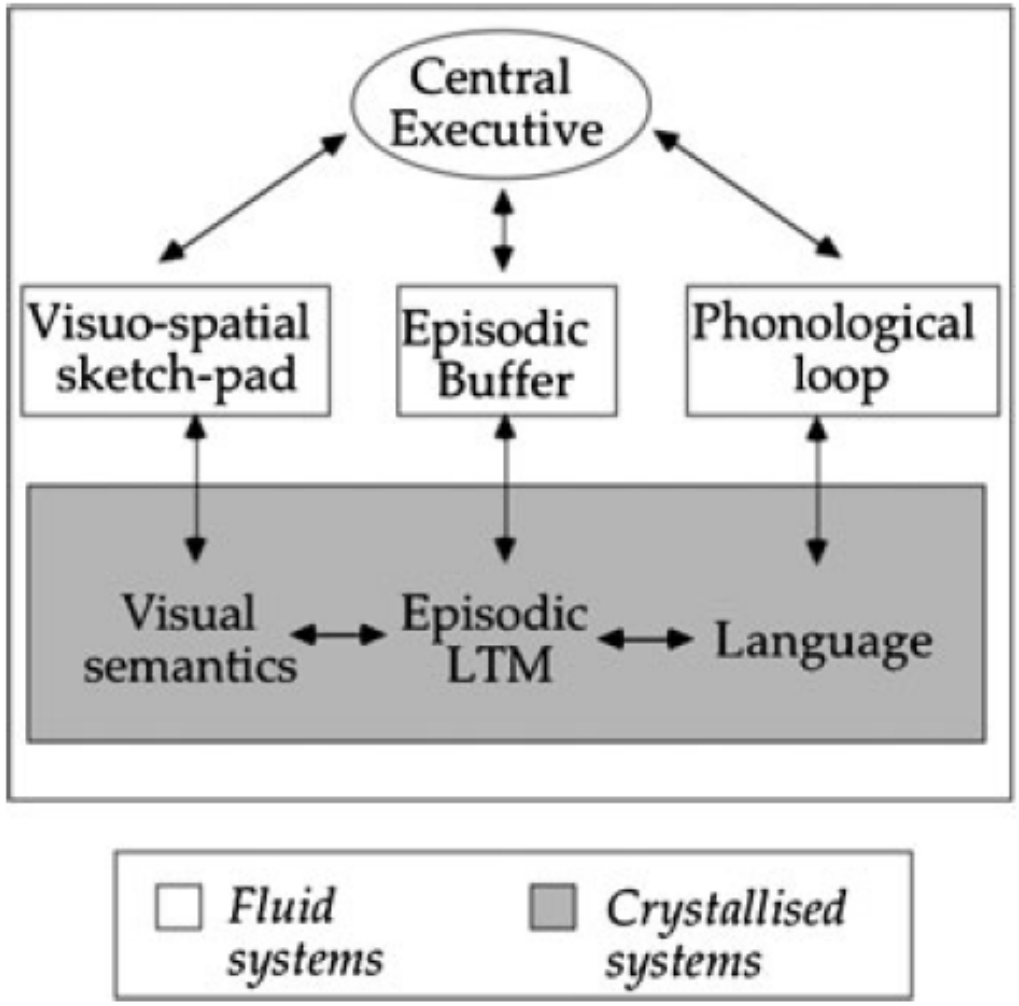
Information Processing Model



Axelrod, 1973

Working Memory



Baddeley, 2012

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, etc.
  - Reduce it
- Germane (Relevant)
  - Schema construction
  - Increase it

Eight Principles of Cognitive Theory Applied to Multimedia Design

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

Mayer, 2002

Eight Principles of Cognitive Theory Applied to Multimedia Design

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

Eight Principles of Cognitive Theory Applied to Multimedia Design

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

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