Instructional Philosophy

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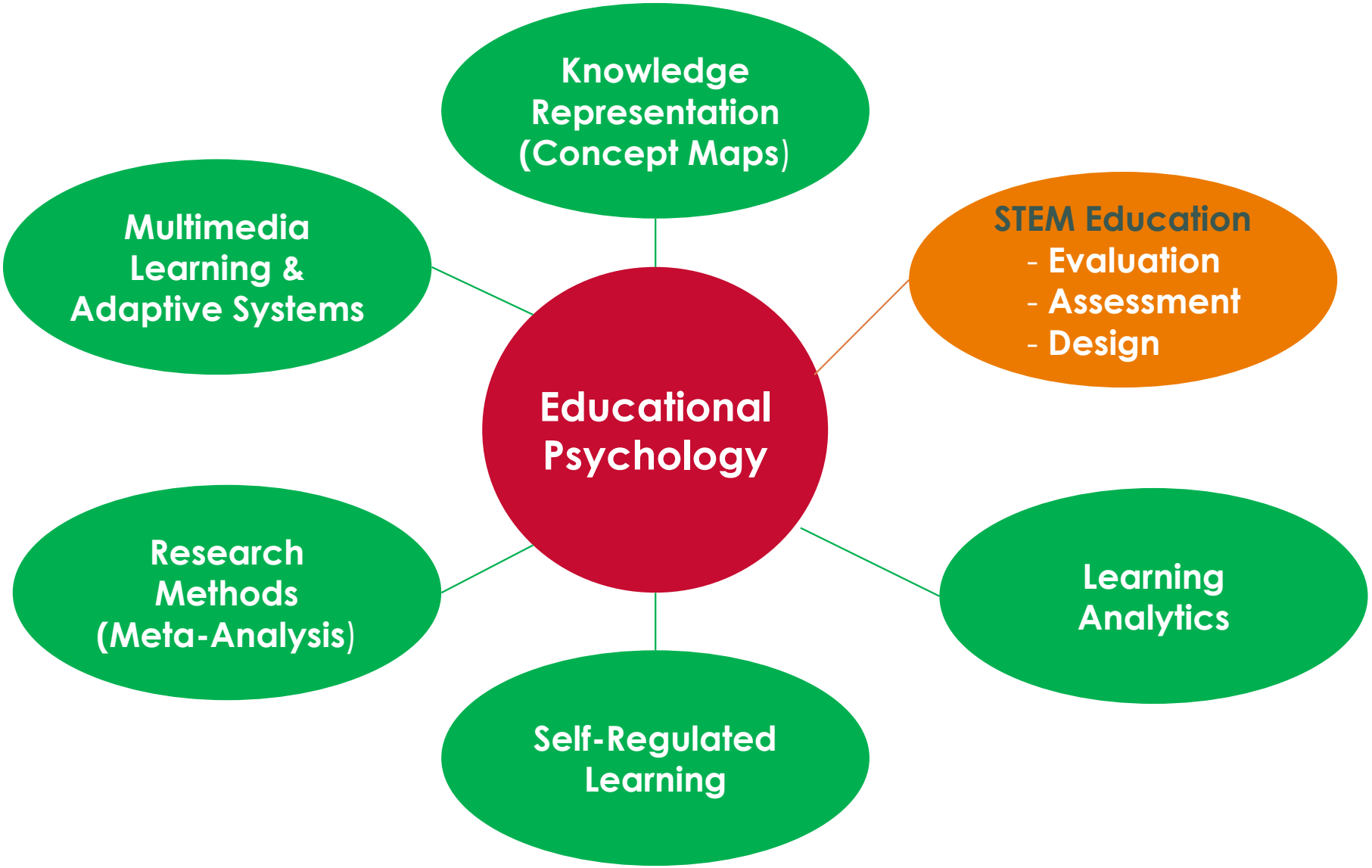
My Interests



Learning Objectives

- **At the end of this presentation, attendees will be able to**
  - Understand some evidence-based theories of learning and instruction
  - Understand how learning theories are applied in effective administration of LC-DLMs

WHAT IS LEARNING?

Learning Is…

An **enduring change** in behavior as a result of practice or other forms of experience

- That is, learning occurs when people are able to do things as a result of what they learned

- Behavioral change endures over a period of time
  - Temporary behavioral changes do not count as learning
  - Behaviors are strengthened or weakened by their consequences

- **Learning occurs through practice or other forms of experience, e.g. observation (Bandura)**

Principles of Learning

Principles of Learning

- **Learning**
  - Is **Change**
  - Is **Inevitable** and **Essential**
  - Can be **Resisted**
  - Can Be **Tacit** and **Incidental** as well as **Conscious** and **Intentional**
  - Is both a **Process** and a **Product**
  - Is **Different** at **Different Points in Time**

Functions of Theory

Functions of Theory

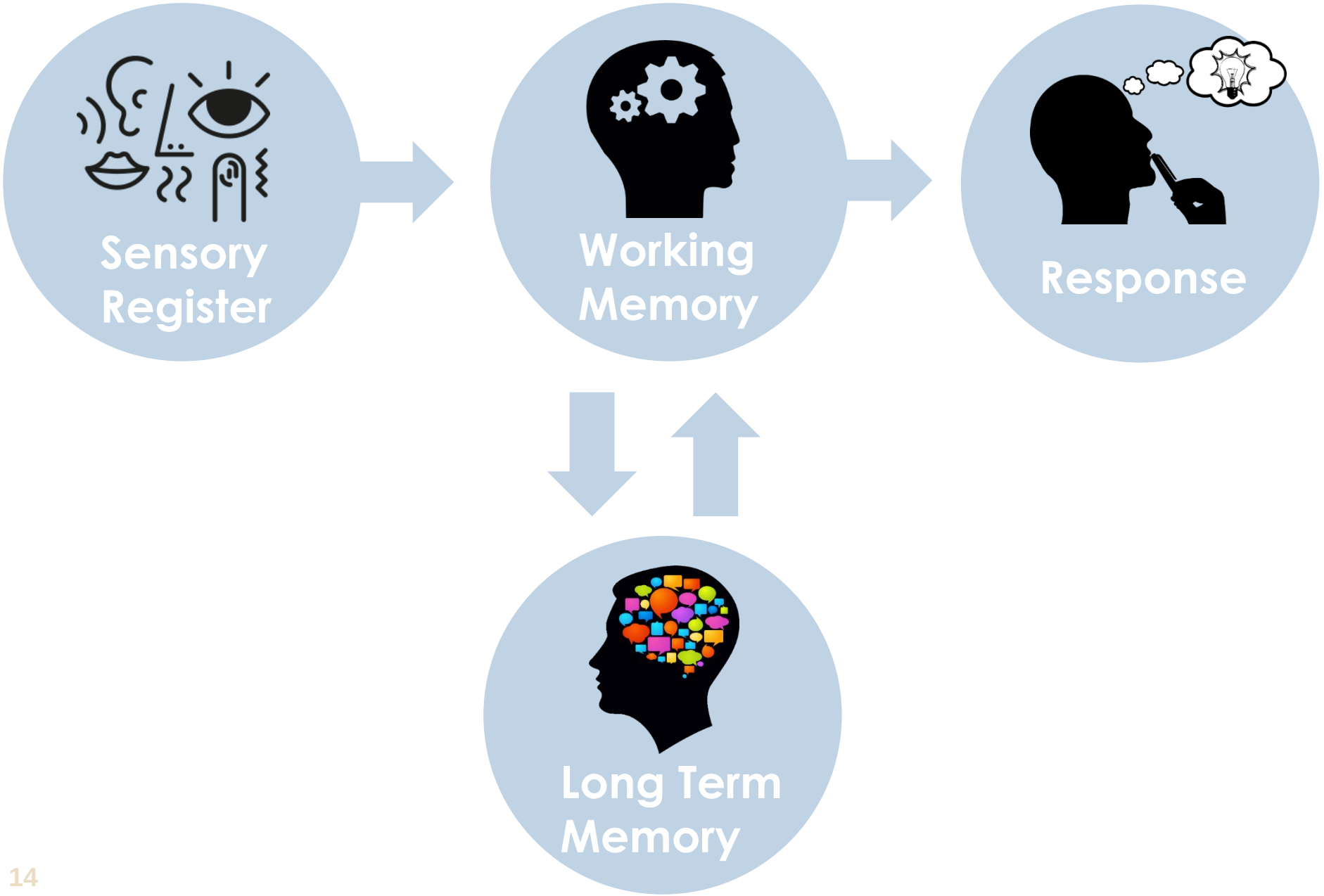
- A theory is a set of scientific principles used to explain a phenomenon
- Provides frameworks for interpreting research results
- Generates new research through hypothesis testing
  - Hypotheses are testable assumptions (e.g., girls are better at reading than boys)
- Strengthened when hypotheses are supported
- May need to be revised if data do not support hypotheses
- **Hence, a theory of learning is a set of principles that explain how learning occurs**

Some Theories of Learning

- **There are several theories of learning**
- **Cognitive Theories**
  - **Cognitive Information Processing Theory**
  - **Cognitive Load Theory**
- **Social Theories**
  - **Social Cognitive Theory of Learning (observational)**
  - **Cooperative Learning**
  - Social Cultural Theory of Learning
  - Situated Learning Theory (contextual)
- **Motivation**
- Behavioral Theories
- Developmental Theories

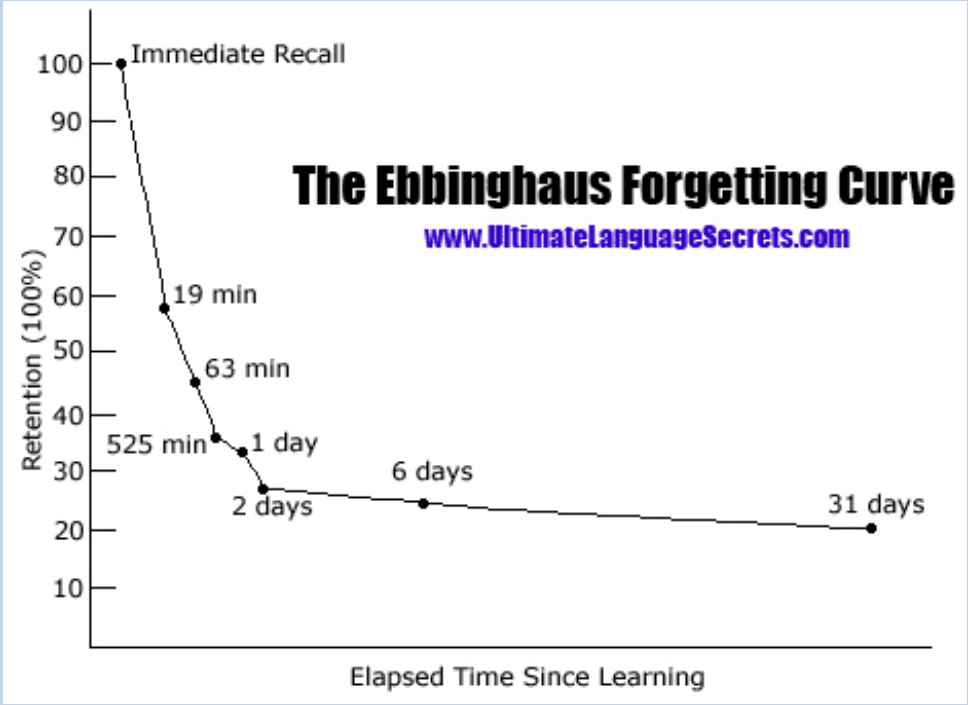
Information Processing Theory

Information Processing Theory



Information Processing Theory of Learning

- Information is processed and stored in the human memory
- We forget more than half of what we've learned within the 1st 1 hour after learning it
- Within 1 day, humans forget ~ 70% of what they learn, especially through lectures
- One way by which we minimize forgetfulness is by to involve learners in the process of learning

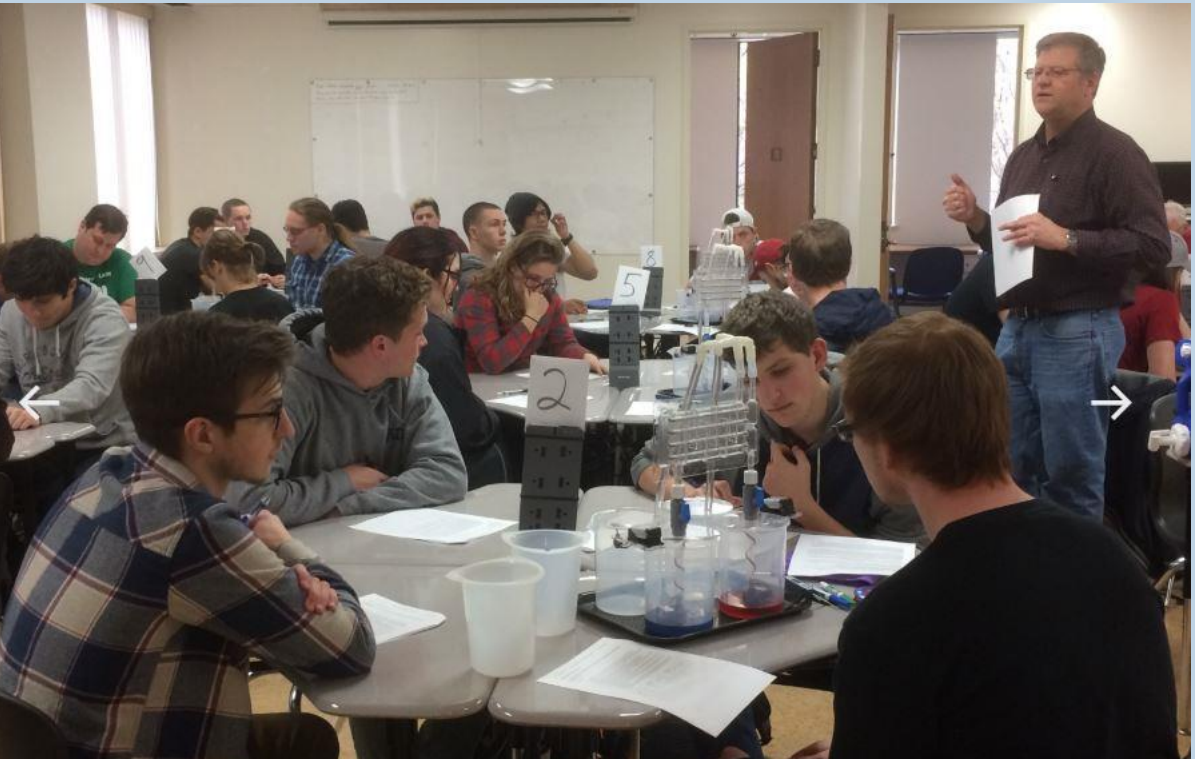


How to minimize forgetfulness

- Make learning meaningful for students
- If you learn something, and it is important to you, and you can connect it with many things you already know (prior knowledge), your memory retention will be very high
- If you learn something, and it is **not** important to you, and you **do not** connect it with anything you already know, you will have poor retention

Quote from Benjamin Franklin

- Tell me and I'll forget
- Show me and I may remember
- Involve me and I will learn/understand



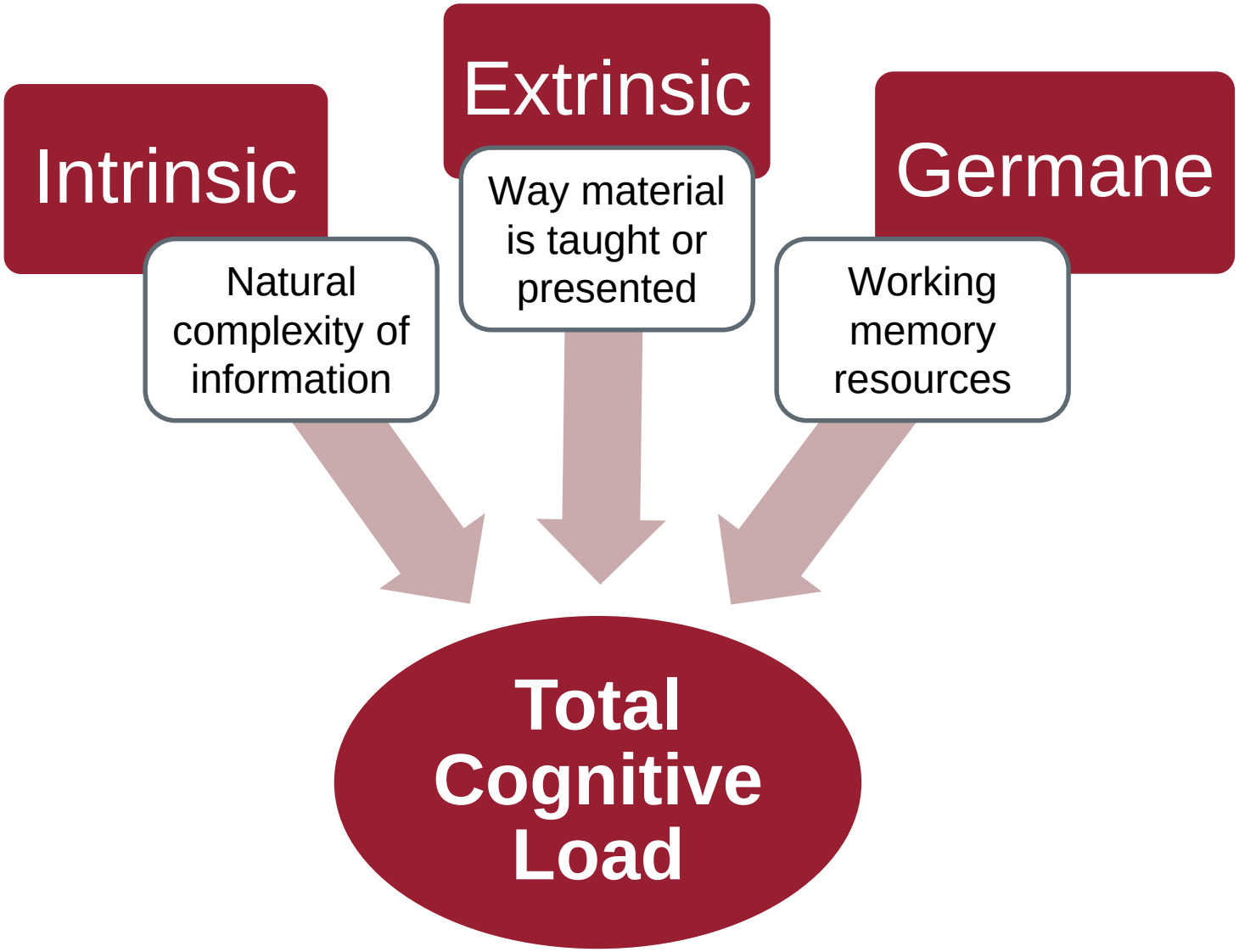
- Our LC-DLMs are set up to involve learners

Cognitive Load Theory

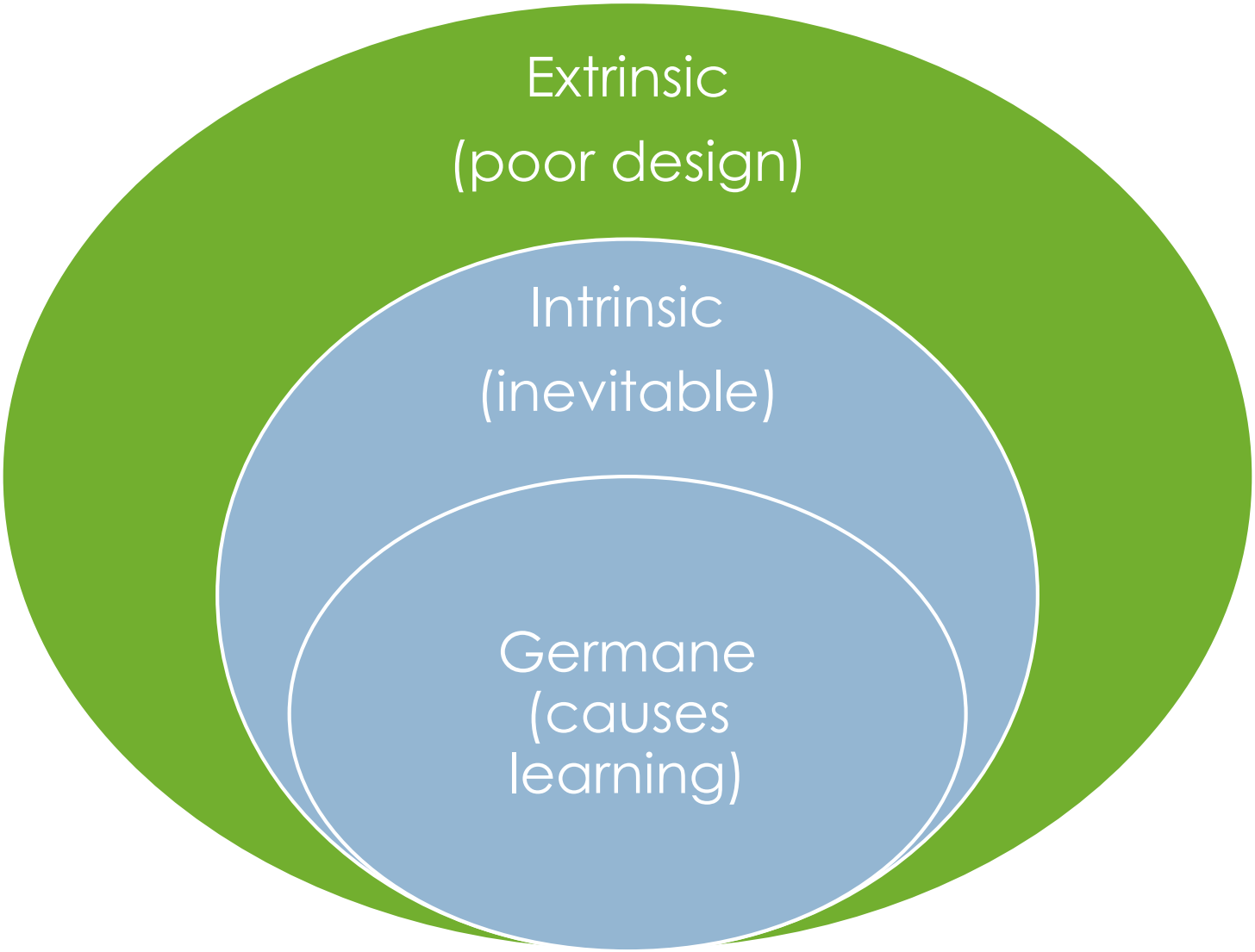
Cognitive Load Theory

- Amount of mental effort, usually working memory, required to process a particular instructional element during learning
- Assumes a potentially unlimited long-term memory holding interacting cognitive schemas as well as **a working memory that is severely limited** when dealing with novel information
- Three types of cognitive load
  - Intrinsic- Cognitive load on working memory may be affected by the inherent nature of the learning task or materials for learning and the way the elements of the task interact
  - Extraneous - the manner in which the learning materials are presented
  - Germane - the amount of cognitive resources that learners devote to schema construction and automation
- Cognitive Load is ADDITIVE, i.e. Total CL = ICL+ECL+GCL

Cognitive Load Theory



Cognitive Load Theory



Cognitive Load Theory with DLMs

- Learning through the LC-DLMs is fostered because:
  - Visual cues in LC-DLMs will minimize cognitive load and promote learning of conceptual concepts.
  - The LC-DLMs aid in students retaining a permanent mental geometric picture to decrease the cognitive load on working memory

Social Learning Theories

- Social Learning Theories were developed because behavioral theories overlook the social influences of learning
  - Learning occurs in social environments
- **Social-Cognitive** Theory
  - Enactive and Vicarious learning
  - Efficacy beliefs
- **Situated** Learning Theory
  - Community of Practice
  - Legitimate Peripheral Participation
- Vygotsky's **Socio-Cultural** Theory of Learning
  - Scaffolding
  - Zone of Proximal Development

Social Cognitive Theory (SCT)

"… much human learning occurs in a **social environment**. By **observing** others, people **acquire knowledge**, rules, skills, strategies, beliefs, and attitudes. Individuals also **learn from models** the usefulness and appropriateness of behaviors, and they act in accordance with beliefs about their capabilities and the expected outcomes of their actions."

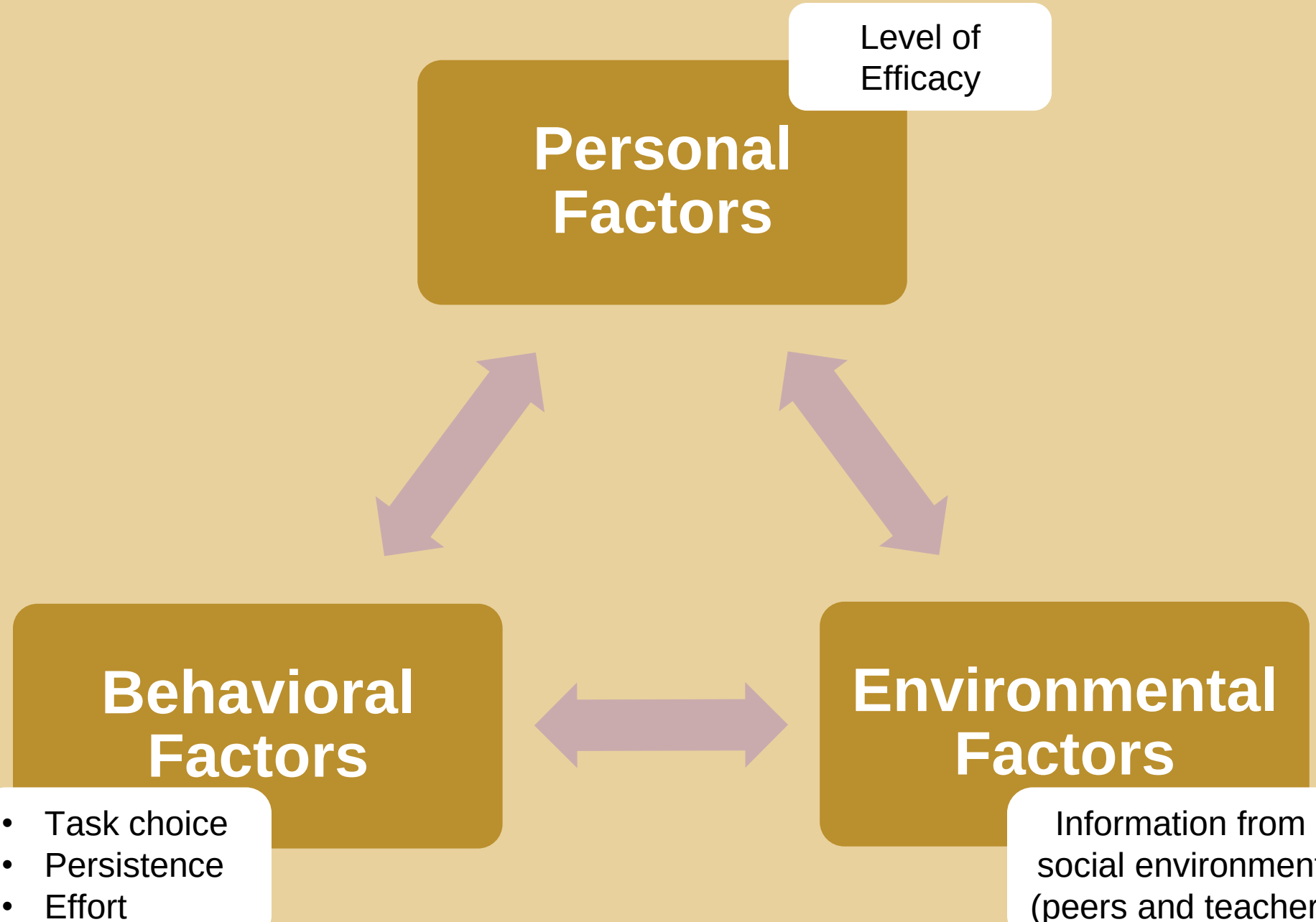
(Schunk, 2012, p. 118)

Social Cognitive Theory (SCT)

- **Play Video** on Social Cognitive Theory

Social Cognitive Theory (SCT)

- Humans learn from their social environment through a series of triadic reciprocal interactions among
  - Personal, behavioral and environmental influences
- Learning occurs enactively or vicariously

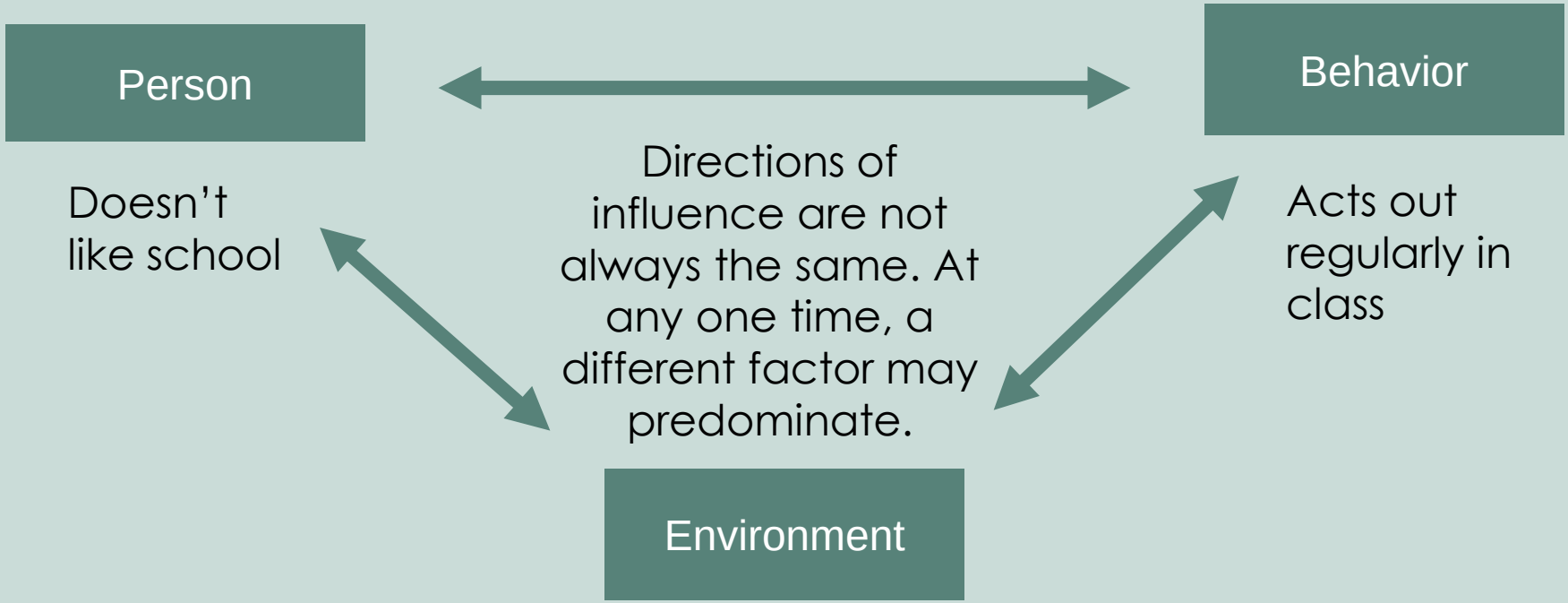

Level of Efficacy
Personal Factors
Behavioral Factors
Environmental Factors
• Task choice
• Persistence
• Effort
Information from social environment (peers and teacher)

Reciprocal Interactions

- Human behavior is guided by reciprocal interactions among behaviors, environmental variables, and personal factors such as cognitions.

Example of Reciprocal Interactions

Consider the example of a child who **does not like school.**



Enactive Learning (in SCT)

- Learning from actually doing something
- Learning from the consequences of one's actions
- Behavioral consequences serve as sources of information and motivation
  - Behaviors that are successful are retained
  - Behaviors that fail are refined or discarded
  - Behaviors motivate people to learn behaviors that are of value and desirable, and to avoid learning behaviors that are punishable

Vicarious Learning (SCT)

- Learning by observing others
- Observing or listening to models
- Accelerates learning and helps people avoid negative consequences
- Motivating because people are more likely to model successful behaviors
- It is better to model successful behaviors
  - Crucial for mentoring and training

Cooperative Learning

Cooperative Learning

- Rectangular Task Activity
- The collaboration effect is expected to be more significant when solving complex problems, in situations of far transfer (contexts different from practice contexts) and for high road transfer (contexts needing a metacognitive effort and an active search for connections).

Cooperative Learning

- Complex problems are better solved collaboratively
- Used extensively in Problem-Based Learning
- Desirable number in a collaborative group is 3 to 5
- Essential elements of cooperative learning
  - Positive interdependence
  - Individual accountability
  - Group processing
  - Appropriate use of social skills
  - Promotive interaction
- We encourage setting up LC-DLM sessions using these principles & theories

Cooperative Learning with LC-DLMs

Thank You!