UNIT 1

Foundations of Educational and Instructional Psychology

CORE ISSUES

- Educational and Instructional Psychology.

- Approaches to research on learning and instruction.

- A cognitive theory of learning and instruction.

- Relations between Psychology and Education. Evidence-based practice.

MAIN SOURCE

- Mayer, R. (2008) Introduction to Learning and Instruction. In Mayer (3-34) *Learning and Instruction*. Merrill. Prentice Hall.

CONTENTS IN CHAPTER (A)

1. Wild boy.

2. Definitions and overview.

3. Three approaches to research on learning and instruction.

4. Three roads for Psychology in Education.

1.Wild boy

a. Why do you think the author has included the wild boy's case as an introduction to a chapter on education, learning and instruction?

b. Could you briefly describe the case of Victor?

c. What was the main purpose of Dr. Itard?

d. Please list and explain the main <u>instructional principles</u> used by Dr. Itard.

e. Which were the main <u>conclusions</u> that could be drawn from the case of Victor <u>in relation to Education</u>.

f. What do you think is <u>Mayer's perspective</u> on Educational Psychology?

1.Wild boy

- **Instructional principles** in Itard's program:
    - Learner-centered approach.
    - Experienced-based.
    - Motivation to learn. (Willingness to learn)
    - Instruction by new devices and techniques

1.Wild boy

- **<u>Educational conclusions</u>**:
  - Role of society and instruction for human development.
  - Learning to satisfy needs.
  - Instructional programs need to be science-based.
  - Instructional programs and learners' individual differences.

1.Wild boy

- **<u>Mayers' perspective:</u>**
  - Learner centered approach to learning and instruction.
  - What students need to know to accomplish academic tasks and how to help students achieve meaninful learning.

2. Definitions and overview

- **Educational Psychology**: Explain with your own words the following statements. Try using your background knowledge!

  - Educational psychology is a science and a branch of psychology.

  - Educational psychology investigates the instructor's manipulation of the environment.

  - Educational psychology investigates resulting changes in the learners' knowledge.

2.Definitions and overview

- **<u>Educational psychology</u>**:
  - Understanding how the instructional environment and the characteristics of the learner interact to produce cognitive growth in the learner.
  - Techniques to foster changes in the learners' knowledge.
  - How instruction affects learning.

2. Definitions and overview

- **Instruction:**
  - What do you think the author means with this statement*: Educational Psychology stands between instruction and learning.*
  - Provide a definition for the following terms: *instruction, learning environments, learners' knowledge.*
  - *List & explain* the *main components in a definition of instruction*, *according to Mayer.*

2.Definitions and overview

- **<u>Instruction</u>**:
  - Construction of environments that foster changes in the learner's knowledge.
  - Role of teacher/instructor.

2. Definitions and overview

- **Learning:** Explain with your own words the following statements. Try using your background knowledge!
  - Learning is long-term.
  - Learning involves a cognitive change that is reflected in a behavioral change.
  - Learning depends on the experience of the learner.
- Which is the connection between teaching and learning?

2. Definitions and overview

- Explain with your own words the following statement:
    - "All learning involves connecting new information to existing knowledge. It is crucial to help students develop knowledge structures that can support the acquisition of useful new information".

2.Definitions and overview

- **<u>Learning</u>**:
  - Lasting changes in the learner's knowledge where such changes are due to experience.
  - Cognitive change reflected in a behavioral change (cognitive approach).
  - Connecting new knowledge to existing knowledge (background knowledge).
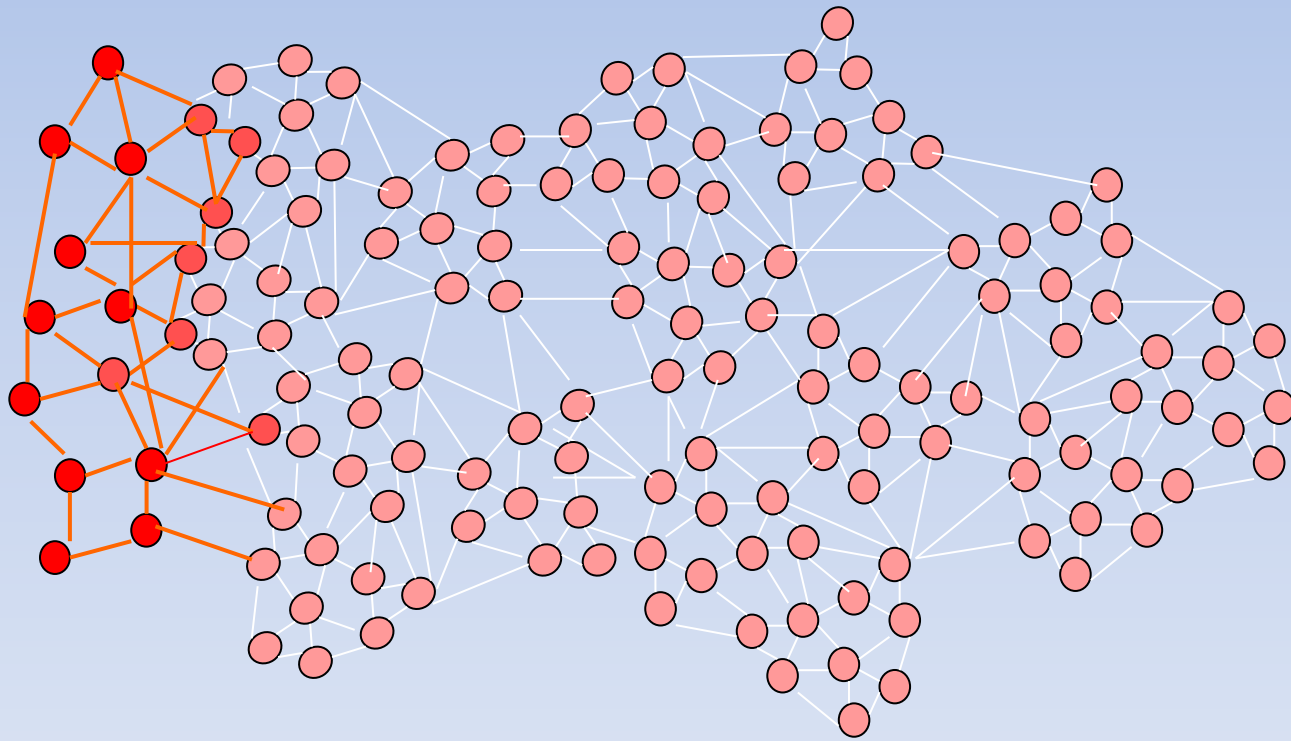
Teaching & learning: constructing mental representations

- **Mental representations** (Kintsch, 1998):
  - Knowledge in our mind (long-term memory).
  - knowledge: declarative and procedural.
  - Attitudes & Beliefs!
  - Teaching : abstract & complex representations.

NEW KNOWLEDGE
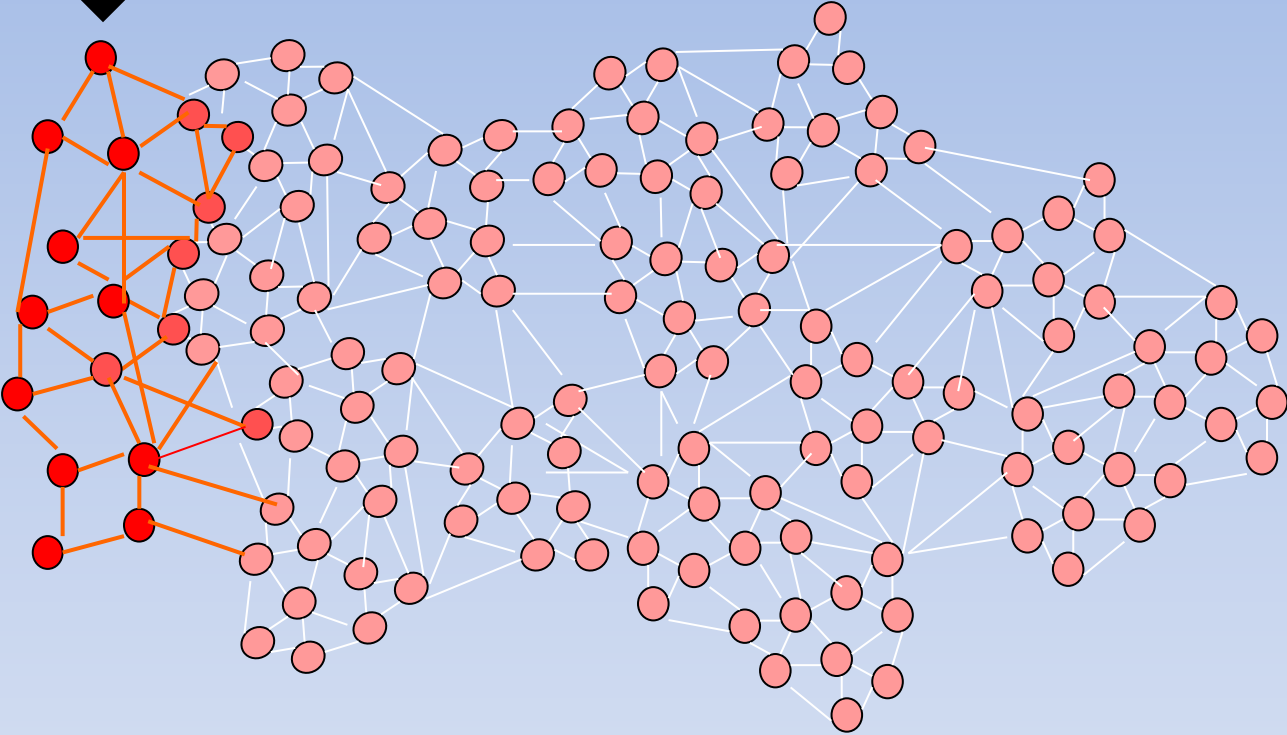
PREVIOUS KNOWLEDGE

NEW KNOWLEDGE + PREVIOUS BACKGROUND KNOWLEDGE = INTEGRATION = **MEANINGFUL LEARNING**

3. Three approaches to research on learning and instruction

- Please complete the following table.

	Behaviorist approach	Cognitive approach	Contextual approach
FOCUS			
VARIABLES			
RESULTS			

3. Three approaches to research on learning and instruction

- Why do you think the author claims the following:

"although the cognitive approach offers a deeper picture of how teaching affects learning than does the behaviorist approach, the picture is still not complete"

3. Three approaches to research on learning and instruction

- **Behaviorist approach:** is one method better than another?

- **Cognitive approach:** how instructional methods affect underlying learning processes and learning outcomes.

- **Contextual approach:** how instructional methods are used in real classroom settings.

	Behaviorist approach	Cognitive approach	Contextual approach
FOCUS	Method A better than B?	Method-mental process-learning outcome	Use of instructional methods in real contexts
VARIABLES	observable manipulation & behavior	Internal cognitive processes and learning outcomes	Context: students, classroom, school & educational system
RESULTS	Method A better than B	Individual differences in cognitive processing	Effects of instructional methods in real settings.

4. Three Roads for Psychology in Education

- Explain the following concepts and relations, which reflect the evolution of Educational Psychology.
  - One way street, Naive Optimism.
  - Dead-end-street, Pessimism.
  - Two-way-street, Cautious optimism.

4. Three Roads for Psychology in Education

- One way street, Naive Optimism. From psychology to education.

- Dead-end-street, Pessimism. Psychology & Education run parallel (they do not meet)

- Two-way-street, Cautious optimism. From psychology to education & from education to psychology.

4. Three Roads for Psychology in Education

- What is <u>Thorndike</u>'s view of Educational Psychology?

- What is <u>William James</u>' view of Educational Psychology?

- Explain the <u>two obstacles</u> to apply psychology to education, according to James.

- Why do you think educational psychology *"was in serious trouble by the mid-1900s"*?

- Relate the <u>pessimism</u> of phase 2 to the <u>reasons of the decline</u> of educational psychology mentioned by Grinder.

4. Three Roads for Psychology in Education

- **Thorndike:** applying scientific results obtained in Psychology to Education.
- **James:** Psychology should give orientations to educators. However, possible limitations in the direct application of psychology to education.
    a) Psychology does not have sufficient results that could guide professional practice
    b) Psychological results can not be directly translated into instructional principles.
- Pessimism & Decline: Pessimism among educators. Can Psychology contribute to the professional practice?

- Pessimism and reasons for decline:
    – **Reasons of decline by Grinder**: withdrawal, fractionation, irrelevance.

4. Three Roads for Psychology in Education

- **Reasons of the decline of educational psychology mentioned by Grinder.**

- Withdrawal: Educational Psychologist lost interest from contributing to educational policies.

- Fractionation: Educational psychologists did not achieve a coherent perspective.

- Irrelevance: The focus of educational psychologists was not of interest of educators (far away, distanced from the interests of educators).

CONTENTS IN CHAPTER (B)

5. Three metaphors of learning.

6. *How people learn*: a cognitive theory of meaningful learning.

7. *How to help people learn*: a cognitive model of instruction.

5. Three Metaphors of Learning

- Match the statements in part a) to the statements in part b)
- Find an example for each of the metaphors of learning.

PART A	PART B
Learning as response strengthening	Adding new facts and skills to your knowledge base
Learning as knowledge acquisition	Understanding how to fit pieces of information together.
Learning as knowledge construction	Adding new behaviors to your repertoire

5. Three Metaphors of Learning

- **Learning as response strengthening**
  - What is the role of the teacher & learner in this model?
  - Why would *drill & practice* be an effective method?
- **Learning as knowledge acquisition**
  - What is the role of the teacher & learner in this model?
  - Methods of instruction?
- **Learning as knowledge construction**
  - What is the role of the teacher & learner in this model?
  - Methods of instruction?

LEARNING	LEARNER	TEACHER	INSTRUCTIONAL METHOD
RESPONSE STRENGTHENING	Passive recipient of rewards & punishments	Dispenser of rewards & punishments	Drill & practice. Basic skills
KNOWLEDGE ACQUISITION	Information processor	Dispenser of information	Textbooks…
KNOWLEDGE CONSTRUCTION	Sense maker	Guide for understanding	discussion, discovery, meaningful tasks

5. Three Metaphors of Learning

- <u>Knowledge construction…explain with your own words:</u>
  - *Instead of emphasizing the learning products, this view emphasizes the learning process.*
  - *Learning occurs when people select relevant information, organize it into a coherent structure and interpret it through what they already know.*

6. How people learn: A **cognitive theory** of **meaningful learning**

- **Principles:**
  - *Dual channels, limited capacity and active processing* (Baddeley, 1999; Mayer, 2001a, Paivio, 1986; Sweller, 1999 y Wittrock, 1989).
- **Memory stores:**
  - Sensory memory, working memory and long term memory.
- **Cognitive Processes:**
  - *Selecting, organizing and integrating.*
- **Kinds of knowledge:**
  - Facts, Concepts, Procedures, Strategies, Beliefs.

(PRINCIPLES) Complete the table. Explain with your own words!

Principle	Description	Example	Instructional implications
Dual Channels			
Limited capacity			
Active processing			

(PRINCIPLES) Complete the table. Explain with your own words!

Principle	Description	Example	Instructional implications
Dual Channels	verbal and visual information	text and picture	Integration of text and picture, if possible
Limited capacity	Working memory (processing is limited)	Failures to learn due to complexity of material.	Try not to overload
Active processing	Engaging in appropriate processing	Effort to learn. Learning by understanding	Teaching in a meaningful way. Selecting relevant info, organizing it, integrating with LTM

(Memory Stores) Complete the table. Explain with your own words!

Memory store	Description	Example	Instructional implications
Sensory Memory			
Working Memory			
Long-term Memory			

(Memory Stores) Complete the table. Explain with your own words!

Memory store	Description	Example	Instructional implications
Sensory Memory	Sense receptors. Unlimited capacity. brief	Selecting information from eyes/ears	appropriate learning experiences/environments/materials
Working Memory	Storage and manipulation of information (temporary)	Whenever we retain information that we have been exposed to.	Making sense of information (understanding). Repetition of info (memorizing)
Long-term Memory	Permanent storage of knowledge	Knowledge we have stored in our mind (declarative/procedural)	Connecting new information with learners' existing knowledge

(COGNITIVE PROCESSES) Complete the table. Explain with your own words!

Cognitive Process	Description	Example	Instructional implications
Selecting			
Organizing			
Integrating			

(COGNITIVE PROCESSES) Complete the table. Explain with your own words!

Cognitive Process	Description	Example	Instructional implications
Selecting	Focusing on relevant features of incoming information. Transfer to WM.	Paying attention to information (reading/viewing/Listening)	Presenting appropriate materials. Guiding learners.
Organizing	Constructing internal connections among pieces of info in WM	Making sense of material. Trying to understand	Engaging learners in meaning making processes.
Integrating	Connecting integrated info from WM with previous knowledge (LTM)	Connections between incoming information and what the learner already knows	Try activating background knowledge.

(kinds of knowledge) Complete the table. Explain with your own words!

Kinds of knowledge	Description	Your Example
Facts		
Concepts		
Procedures (Procedural knowledge)		
Strategies (Strategic knowledge)		
Beliefs		

(kinds of knowledge) Complete the table. Explain with your own words!

Kinds of knowledge	Description	Your Example
Facts	Semantic knowledge	Today is Friday.
Concepts	Categories, schemas, principles	Differentiating/diagnosing mental disorders.
Procedures (Procedural knowledge)	List of steps to be used in a specific situtation	How to cook spanish omelette.
Strategies (Strategic knowledge)	Metacognition and supervision	Monitoring and planning how to pass a course
Beliefs	Beliefs/ Self-efficacy beliefs/ Personal epistemologies	Beliefs: psychology is easy. Self-efficacy: I do not feel capable of… Epistemologies: there is always a correct response

7. How to help people learn: A **cognitive model of instruction**

- Factors in the teaching-learning process (explain!):
  - *Instructional manipulations*: sequence of events
  - *Learner characteristics:* existing knowledge & strategies.
  - *Learning context:* social and cultural context of learning.
  - *Learning process:* internal cognitive processes.
  - *Learning outcome:* cognitive changes in knowledge (rote vs. Meaningful)
  - *Outcome performance*: performance on tests (retention + transfer)

7. How to help people learn: A **cognitive model of instruction**

- Three learning outcomes:

| Type of learner	Retention	Transfer
Nonlearning	Poor	Poor
Rote Learning (Nonunderstander)	Good	Poor
Meaningful Learning (Understander)	Good	Good

7. How to help people learn: A **cognitive model of instruction**

- Explain the relationship between the cognitive processes involved in meaningful learning and the three kinds of learning outcomes.
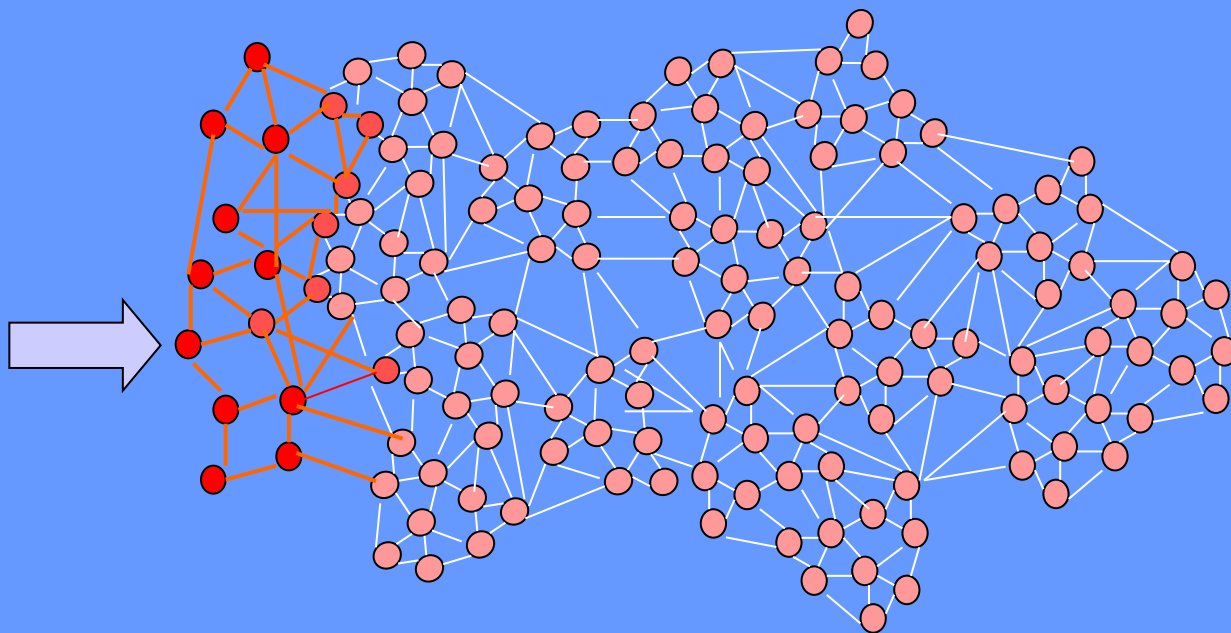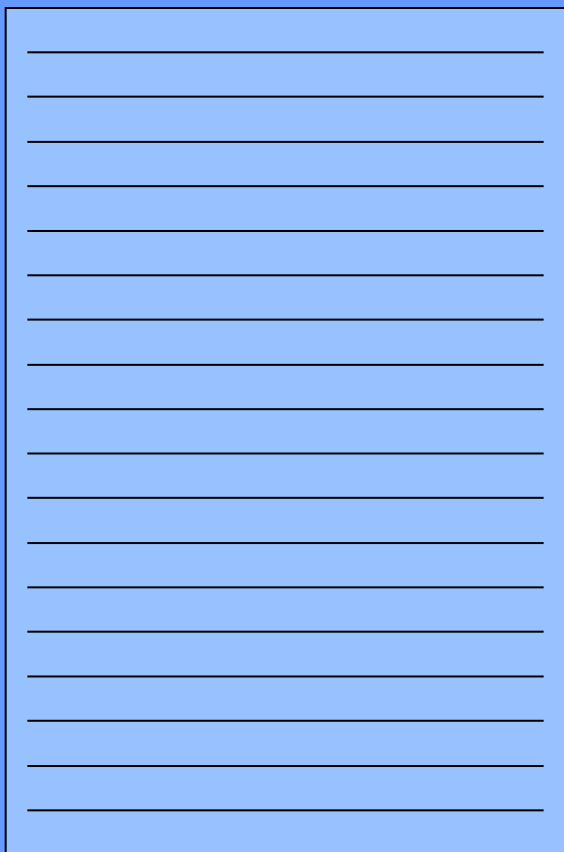
Non-learning
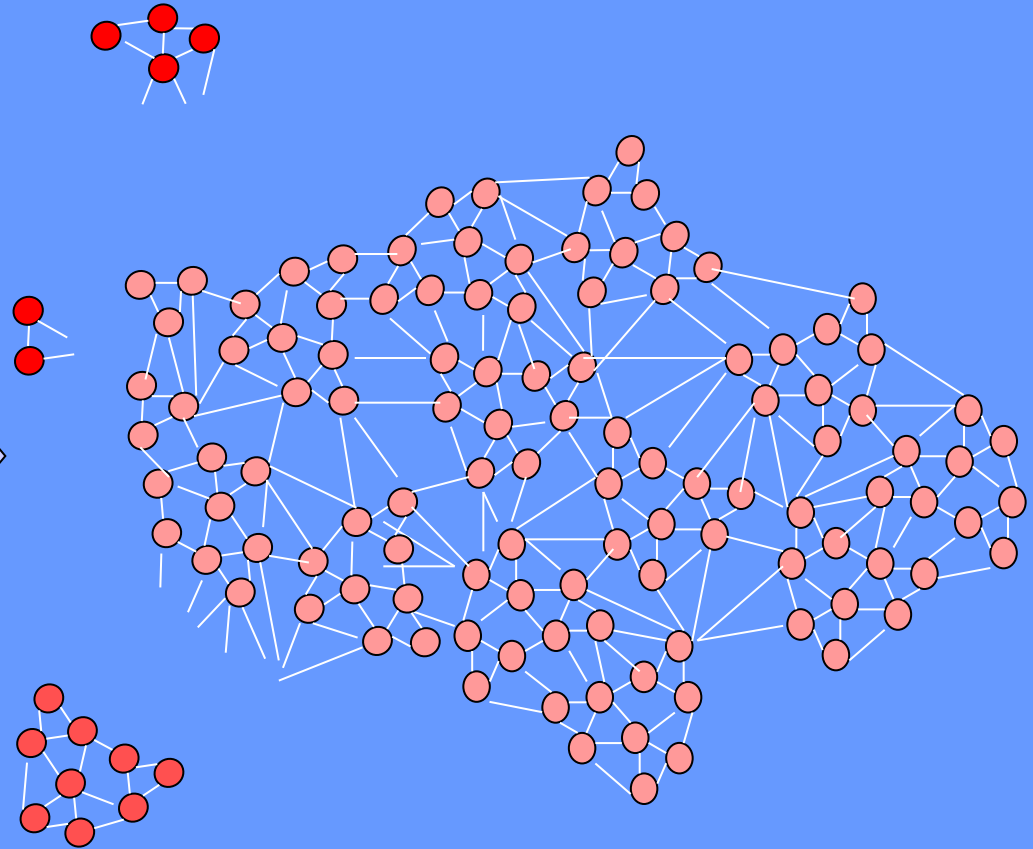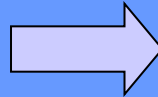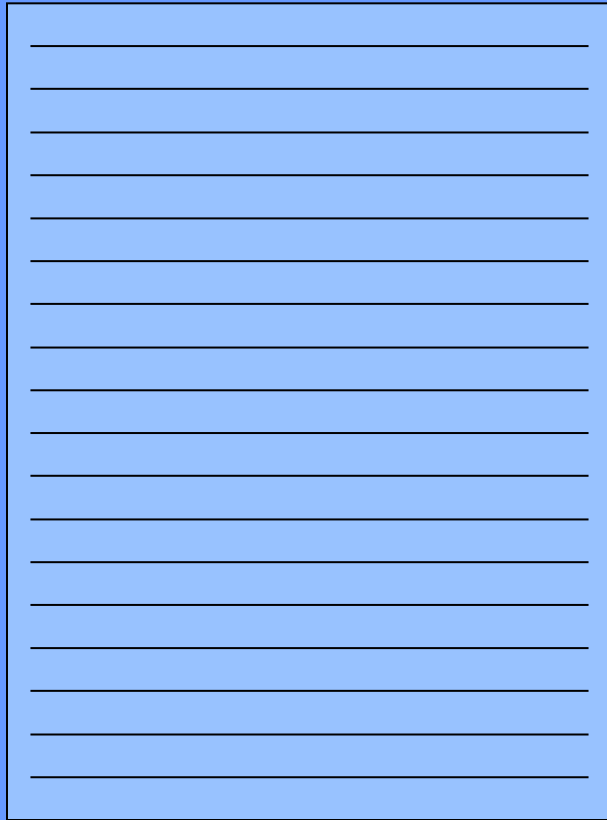
Rote learning
(Superficial)
Nonunderstander
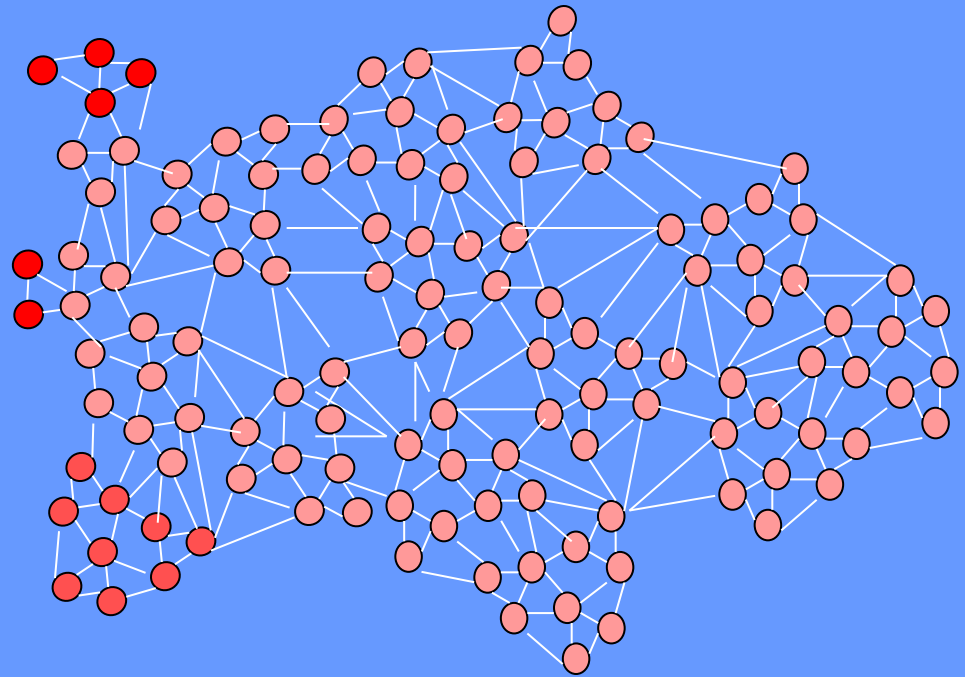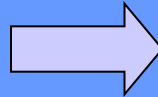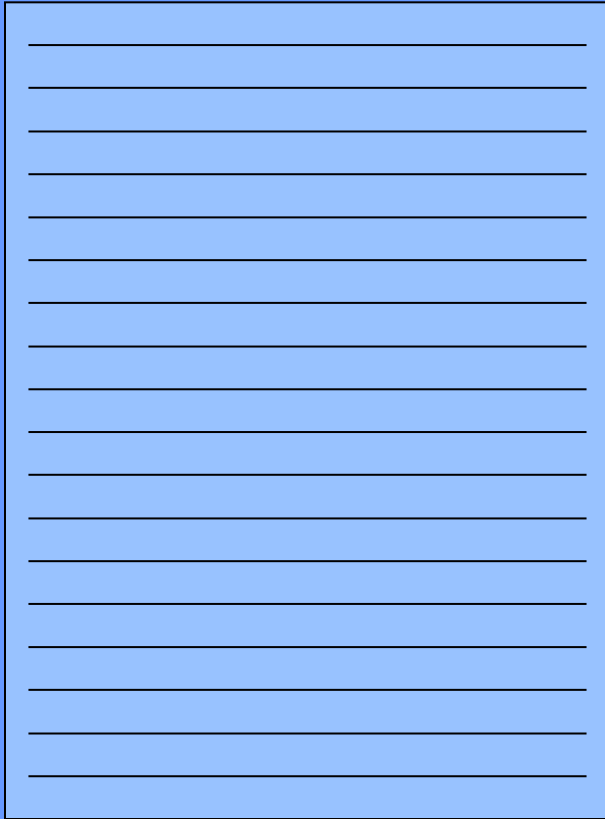
Understander
(deep)
Meaningful learning

7. How to help people learn: A **cognitive model of instruction**

- Three kinds of cognitive load (explain!):
  - Intrinsic cognitive load (element interactivity). Under control.
  - Extraneous cognitive load (extraneous material). Minimize
  - Germane cognitive load (deep processing) Promote.
- Which are the consequences for instruction?

END OF UNIT 1