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

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 instructional principles used by Dr. Itard.

e. Which were the main conclusions that could be drawn from the case of Victor in relation to Education?

f. What do you think is Mayer’s perspective 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
• **Educational conclusions:**
  – 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

- **Mayers’ perspective:**
  - Learner centered approach to learning and instruction.
  - What students need to know to accomplish academic tasks and how to help students achieve meaningful 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

• Educational psychology:
  – 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

- **Instruction:**
  - 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

- **Learning**:
  - 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).
Mental representations (Kintsch, 1998):

- Knowledge in our mind (long-term memory).
- Knowledge: **declarative and procedural**.
- Attitudes & Beliefs!
- Teaching: abstract & complex representations.
NEW KNOWLEDGE + PREVIOUS BACKGROUND
KNOWLEDGE = INTEGRATION = MEANINGFUL LEARNING
3. Three approaches to research on learning and instruction

- Please complete the following table.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Behaviorist approach</th>
<th>Cognitive approach</th>
<th>Contextual approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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.
<table>
<thead>
<tr>
<th></th>
<th>Behaviorist approach</th>
<th>Cognitive approach</th>
<th>Contextual approach</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FOCUS</strong></td>
<td>Method A better than B?</td>
<td>Method-mental process-learning outcome</td>
<td>Use of instructional methods in real contexts</td>
</tr>
<tr>
<td><strong>VARIABLES</strong></td>
<td>observable manipulation &amp; behavior</td>
<td>Internal cognitive processes and learning outcomes</td>
<td>Context: students, classroom, school &amp; educational system</td>
</tr>
<tr>
<td><strong>RESULTS</strong></td>
<td>Method A better than B</td>
<td>Individual differences in cognitive processing</td>
<td>Effects of instructional methods in real settings.</td>
</tr>
</tbody>
</table>
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 Thorndike’s view of Educational Psychology?
- What is William James’ view of Educational Psychology?
- Explain the two obstacles to apply psychology to education, according to James.
- Why do you think educational psychology “was in serious trouble by the mid-1900s”?
- Relate the pessimism of phase 2 to the reasons of the decline 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).
5. Three metaphors of 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.

<table>
<thead>
<tr>
<th>PART A</th>
<th>PART B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning as response strengthening</td>
<td>Adding new facts and skills to your knowledge base</td>
</tr>
<tr>
<td>Learning as knowledge acquisition</td>
<td>Understanding how to fit pieces of information together.</td>
</tr>
<tr>
<td>Learning as knowledge construction</td>
<td>Adding new behaviors to your repertoire</td>
</tr>
</tbody>
</table>
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?
<table>
<thead>
<tr>
<th>LEARNING</th>
<th>LEARNER</th>
<th>TEACHER</th>
<th>INSTRUCTIONAL METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE STRENGTHENING</td>
<td>Passive recipient of rewards &amp; punishments</td>
<td>Dispenser of rewards &amp; punishments</td>
<td>Drill &amp; practice. Basic skills</td>
</tr>
<tr>
<td>KNOWLEDGE ACQUISITION</td>
<td>Information processor</td>
<td>Dispenser of information</td>
<td>Textbooks...</td>
</tr>
<tr>
<td>KNOWLEDGE CONSTRUCTION</td>
<td>Sense maker</td>
<td>Guide for understanding</td>
<td>discussion, discovery, meaningful tasks</td>
</tr>
</tbody>
</table>
5. Three Metaphors of Learning

- **Knowledge construction...** explain with your own words:
  - *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:**
**PRINCIPLES** Complete the table. Explain with your own words!

<table>
<thead>
<tr>
<th>Principle</th>
<th>Description</th>
<th>Example</th>
<th>Instructional implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual Channels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limited capacity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active processing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(PRINCIPLES) Complete the table. Explain with your own words!

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


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

<table>
<thead>
<tr>
<th>Memory store</th>
<th>Description</th>
<th>Example</th>
<th>Instructional implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term Memory</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Memory Stores** Complete the table. Explain with your own words!

<table>
<thead>
<tr>
<th>Memory store</th>
<th>Description</th>
<th>Example</th>
<th>Instructional implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensory Memory</td>
<td>Sense receptors. Unlimited capacity.</td>
<td>Selecting information from eyes/ears</td>
<td>Appropriate learning experiences/environments/materials</td>
</tr>
<tr>
<td>Working Memory</td>
<td>Storage and manipulation of information (temporary)</td>
<td>Whenever we retain information that we have been exposed to.</td>
<td>Making sense of information (understanding). Repetition of info (memorizing)</td>
</tr>
<tr>
<td>Long-term Memory</td>
<td>Permanent storage of knowledge</td>
<td>Knowledge we have stored in our mind (declarative/procedural)</td>
<td>Connecting new information with learners’ existing knowledge</td>
</tr>
</tbody>
</table>
(COGNITIVE PROCESSES) Complete the table. Explain with your own words!

<table>
<thead>
<tr>
<th>Cognitive Process</th>
<th>Description</th>
<th>Example</th>
<th>Instructional implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selecting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrating</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**COGNITIVE PROCESSES** Complete the table. Explain with your own words!

<table>
<thead>
<tr>
<th>Cognitive Process</th>
<th>Description</th>
<th>Example</th>
<th>Instructional implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selecting</td>
<td>Focusing on relevant features of incoming information. Transfer to WM.</td>
<td>Paying attention to information (reading/viewing/listening)</td>
<td>Presenting appropriate materials. Guiding learners.</td>
</tr>
<tr>
<td>Organizing</td>
<td>Constructing internal connections among pieces of info in WM</td>
<td>Making sense of material. Trying to understand</td>
<td>Engaging learners in meaning making processes.</td>
</tr>
<tr>
<td>Integrating</td>
<td>Connecting integrated info from WM with previous knowledge (LTM)</td>
<td>Connections between incoming information and what the learner already knows</td>
<td>Try activating background knowledge.</td>
</tr>
</tbody>
</table>
(kinds of knowledge) Complete the table. Explain with your own words!

<table>
<thead>
<tr>
<th>Kinds of knowledge</th>
<th>Description</th>
<th>Your Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concepts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedures (Procedural knowledge)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategies (Strategic knowledge)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beliefs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(kinds of knowledge) Complete the table. Explain with your own words!

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

<table>
<thead>
<tr>
<th>Type of learner</th>
<th>Retention</th>
<th>Transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonlearning</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Rote Learning (Nonunderstander)</td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Meaningful Learning (Understander)</td>
<td>Good</td>
<td>Good</td>
</tr>
</tbody>
</table>
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
Three kinds of cognitive load (explain!):

– Extraneous cognitive load (extraneous material). Minimize
– Germane cognitive load (deep processing) Promote.

Which are the consequences for instruction?
END OF UNIT 1