Lifelong Learning Companion: Pedagogical Requirements

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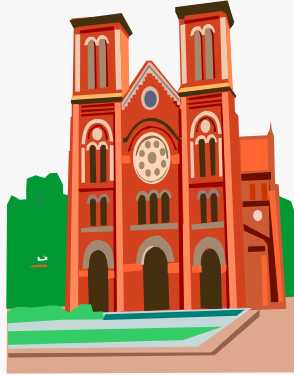millie.abell@us.army.mil
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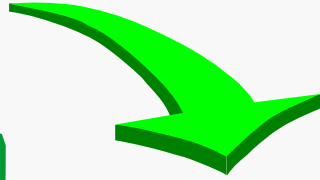**ICT Workshop on Intelligent Lifelong Learning Companions**

Overview

- **TRADOC's Learning Sciences Mission**
- **TRADOC's Constraint & Challenge**
- **Meeting the Challenge**
- **Instructional Design: First Principles**
- **Learning Strategies: Mental Processes**
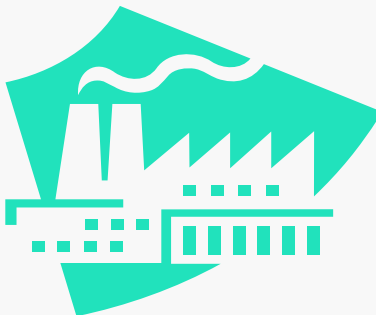- **Final Considerations**

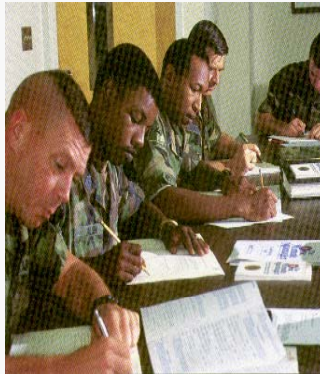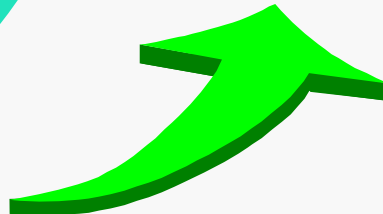# TRADOC's Learning Sciences Mission

ACADEMIA

INDUSTRY

FEDERAL GOVERNMENT

- Investigate research in adult learning & instruction, &

- Recommend evidence-based practices to ensure Soldiers are competent to perform within a dynamic environment.

TRADOC's Constraint & Challenge

Constraint:
Time

Army Requires Less Time in School

Impacts Learning Environment

Challenge: Educate leaders faster with no loss in performance.

Learning Environment

Media

Learner ↔ **Design**

More technology-based instruction (TBI)

More powerful learning strategies

Instructional design models for efficient learning
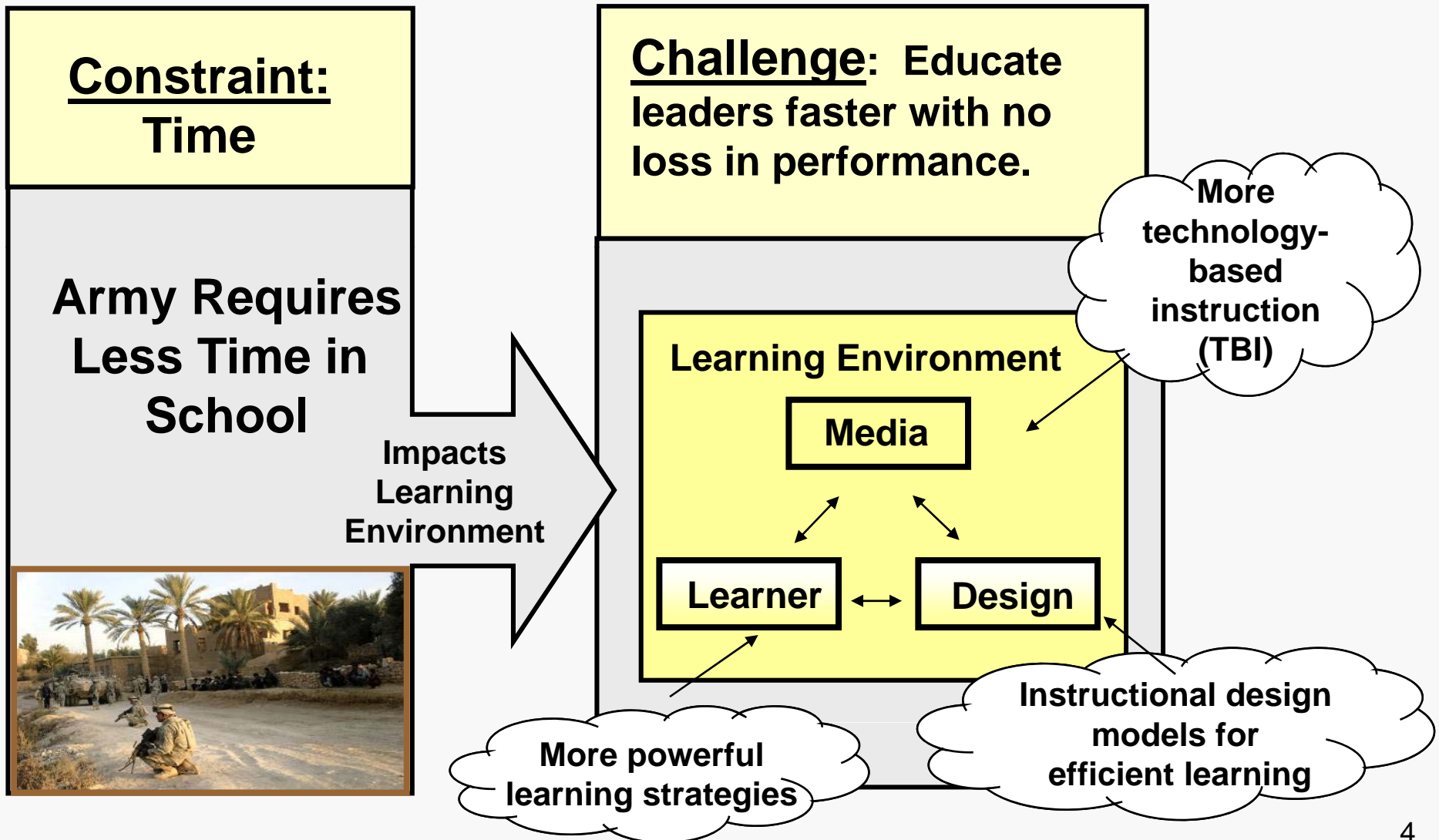
Meeting the Challenge

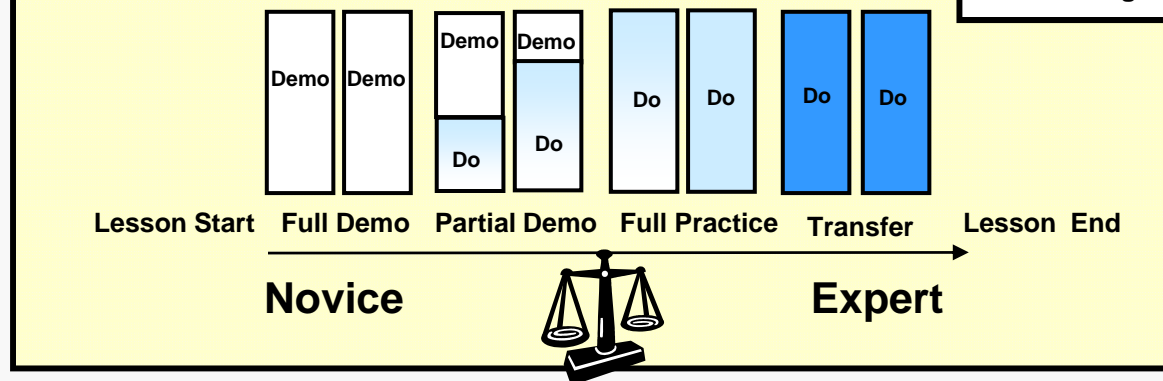| TRADOC will…	By …
• **Determine when to use:** • **face-to-face (f2f), or** • **TBI**	**Using f2f if TBI won't allow:** • **Sensory information** • **Or complex environment** • **Or on-the-spot observation & feedback of complex performance**
• **Design efficient & effective TBI & f2f instruction**	**Training designers in *First Principles*** • **Job-relevant problem** • **Activate prior knowledge** • **Demonstrate, *then* practice** • **Transfer**
• **Strengthen learning skills/ mental processes**	**Teaching learners to:** • **Take multiple perspectives** • **Question** • **Self-explain** • **Think analogically** • **Prepare to teach**

"The Primer" contains knowledge of:
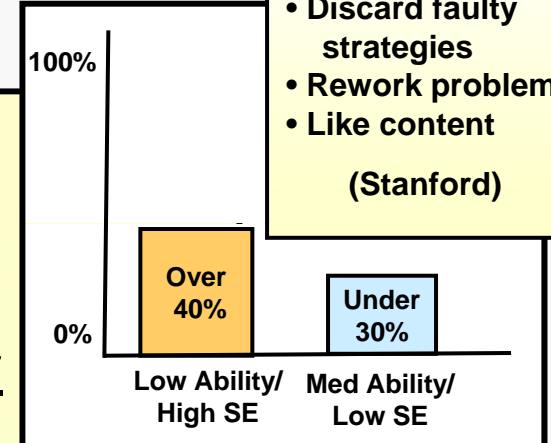• how humans acquire new knowledge, &
• how to explain & teach

Instructional Design: First Principles

• Faster to train
• Fewer test errors
(University of New South Wales)

Build Self-Efficacy

High S-E Learners:
• Set challenging goals
• Visualize success
• Discard faulty strategies
• Rework problems
• Like content

(Stanford)

100%

0%

Over 40%

Under 30%

Low Ability/ High SE

Med Ability/ Low SE

Job-Relevant Task
Demo -- Practice – Transfer

Demo | Demo | Demo | Demo | Do | Do | Do | Do

Do | Do

Lesson Start | Full Demo | Partial Demo | Full Practice | Transfer | Lesson End

Novice   **Expert**

- Job-relevant problem
- Activate prior knowledge
- Demonstrate, *then* practice
- Transfer to new instances

Taking Multiple Perspectives

IMI

Text
(Harvard)

"In most cases…"
"May include…"
"Is probably…"
"Of course, there are other ways…"

> Greater transfer when learners solve problems w/in context of scenarios (Vanderbilt)

Asking Deeper Questions
(California State, San Marcos)

What is a new example of…?
How would you use … to …?
Compare … with regard to …
What would happen if…?
Why is … important?
What is the best …, & why?

Learning Strategies: Mental Processes

Self-explaining
(Pittsburgh)

Self-explanations	Correct Solutions
Many	86%
Few	42%

Thinking Analogically
(Michigan)
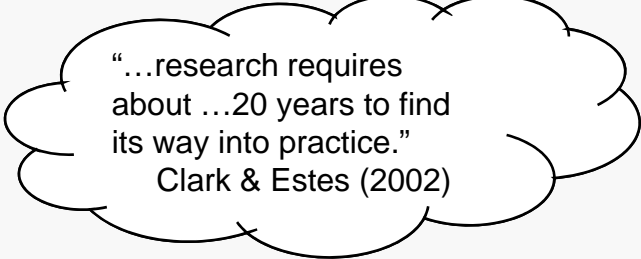
Bridging previously unconnected knowledge (e.g. Duncker's problem)

Preparing to Teach Rather Than Test
(Vanderbilt)

	Teach	Test
• Consider larger context	100%	0%
• Don't memorize details	0%	50%
• Question purpose	92%	33%
• Identify flaws	83%	17%
• Generate alternatives	50%	0%

> Teachable Agents

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Final Considerations

- **Pass on evidence-based instructional strategies:**
  - **Learning to learn**
  - **Instructional design**
  - **Teaching**

"…research requires about …20 years to find its way into practice."
Clark & Estes (2002)

- **Consider learner affect – e.g.:**
  - **Cooperating**
  - **Demonstrating sensitivity to others**
  - **Listening**
  - **Responding w/ honesty/authenticity**
  - **Applying what is studied**

- **Learning on-the-job is significant**

Sources

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Questions?