

Re-use of a Serial List Model for Aircraft Procedure Learning

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Goal: Use ACT-R To Make Quantitative Training Time and Performance Predictions for Aircraft Procedures

Method: Re-use Anderson et al. (1998) Serial List Learning Model with Procedures that are Described as a Serial List of Actions, Memorized, and Executed by Retrieving Each Item and Performing Action Described by Item

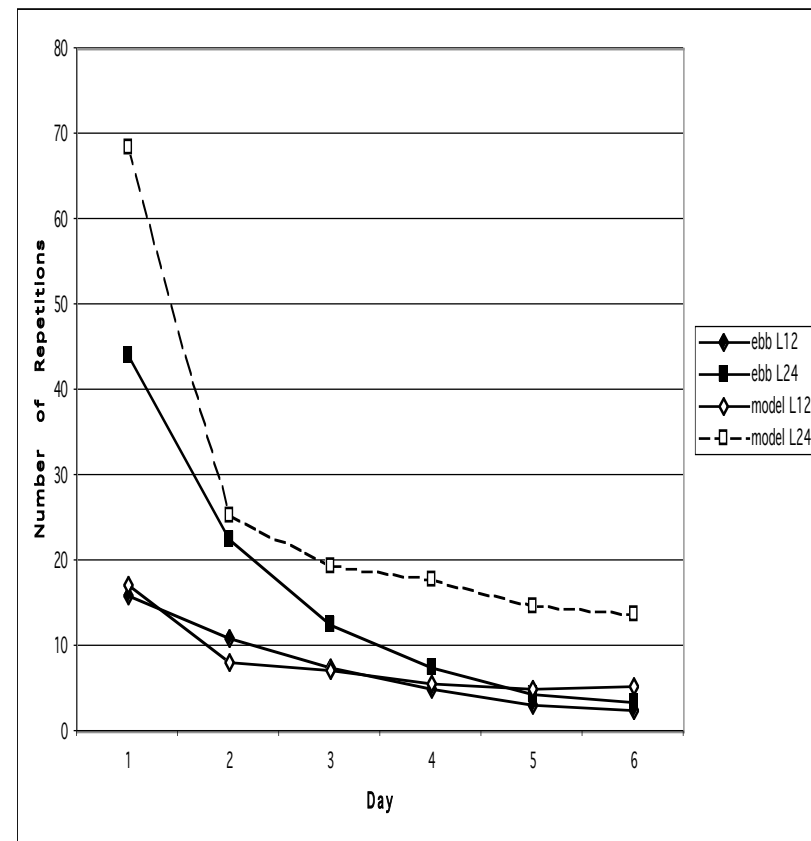
Novice Representation of Procedures

- Based on observations that current training practices can lead novices to treat training as list learning
- Resulting lists are very difficult to memorize and rapidly forgotten

1. FMS has Direct To Function
2. Press Legs Page Key
3. Get Waypoint Identifier
 - a. In Clearance OR
 - b. Retrieve From LTM OR
 - c. *Scan Leg Page(s) OR
 - d. Ask ATC OR
 - e. Look up on Chart
4. Enter INTO Scratch Pad
5. Press LSK 1L
6. Press? ABEAM PTS> LSK
7. Verify Change on ND
 - a. Modify range if necessary
 - b. Formulate what you expect to see on ND
8. Press EXECUTE

Ebbinghaus (1888) Data Modeled with Anderson et al. (1998) Serial List Learning Model

- Model pushed to represent 24-item list as 8 groups of 3 items (new productions acting on a deeper hierarchy may be a better representation)
- Initial performance of each day suffers from “overnight” decay of activation



Expert Representation of Procedures

- Experts can use retrieval structures to guide learning (encoding) and retrieval
- This results in shorter lists to retrieve from memory

1. FMS Has Direct-To Function
2. **REFORMULATE**: Edit Leg Page
Inserting Waypoint into 1L
3. **ACCESS**: Legs Page
4. **FORMAT**: Waypoint
5. **INSERT**: 1L
6. Press ABEAM WPTS> LSK?
7. **VERIFY**: On ND
8. **Press Execute**

Items in **RED** Do Not Have To Be Memorized

Expert Data Modeled with Serial List Learning Model plus Anderson et al. (1999) Time Slowing

- Time slowing needed to retrieve pre-proceduralized lists over the course of weeks
- BUT time slowing changes Ebbinghaus results!
- Is time slowed the same for nonsense vs meaningful lists?

