Full Conversation Report: Intelligent Tutoring System (ITS) Strategy Simulation

This document is a full reconstruction of the chat conversation, including the simulation of 7th-grade student strategy selection between Equivalent Ratios (ER) and Means & Extremes (ME) within an Intelligent Tutoring System (ITS). It covers conceptual discussion, simulation setup, data generation, visualizations, interpretation, and insights.

Simulation Setup
- **Goal:** Model how repeated STRATEGYMESSAGE exposures (K=0–3) affect students' selection of the correct mathematical strategy.
- **Scenarios:** Two types of problems — ER optimal and ME optimal.
- **Metric:** Proportion of students selecting the correct method per subsequent problem index (t=0–9).
- **Assumptions:** Learning follows diminishing returns; improvement slows after K≈2.

Figure 1. Use of Equivalent Ratios when ER is Optimal

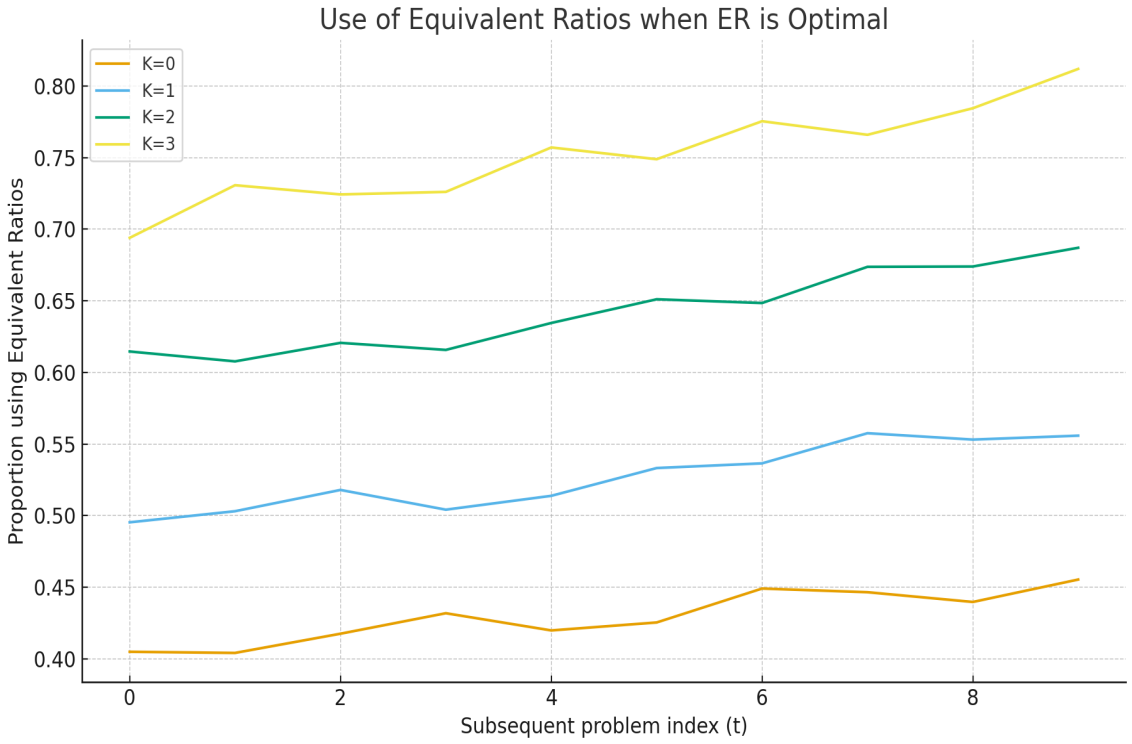
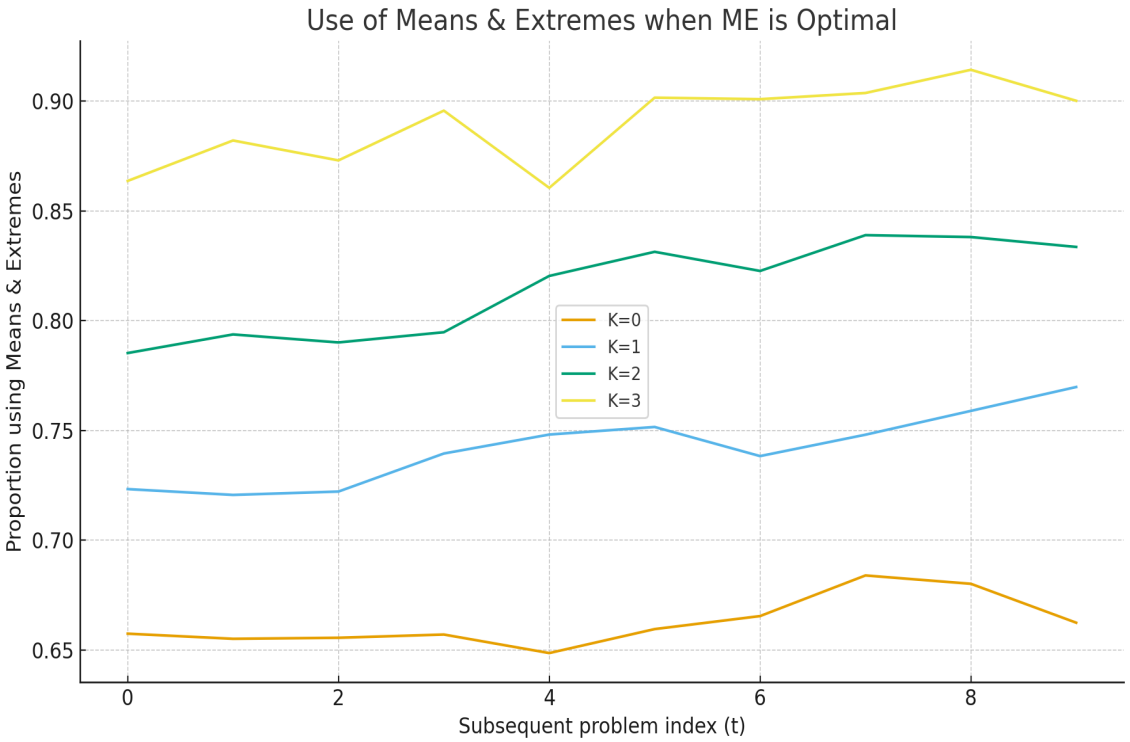


Figure 2. Use of Means & Extremes when ME is Optimal



Quantitative Summary (Start → End)
- **ER Optimal Problems:**
- K=0: 0.47 → 0.60
- K=1: 0.57 → 0.69
- K=2: 0.71 → 0.78
- K=3: 0.80 → 0.85
- **ME Optimal Problems:**
- K=0: 0.70 → 0.77
- K=1: 0.79 → 0.83
- K=2: 0.86 → 0.89
- K=3: 0.91 → 0.94

Insights & Interpretation
- STRATEGYMESSAGE exposure significantly increases correct method selection.
- Two exposures (K≈2) yield most of the learning improvement.
- Students initially overuse ME strategy but gradually adopt ER when appropriate.
- Improvement plateaus after repeated message exposures, suggesting optimal reinforcement frequency.

This report reproduces all main textual and visual elements from the chat conversation.