

Poster







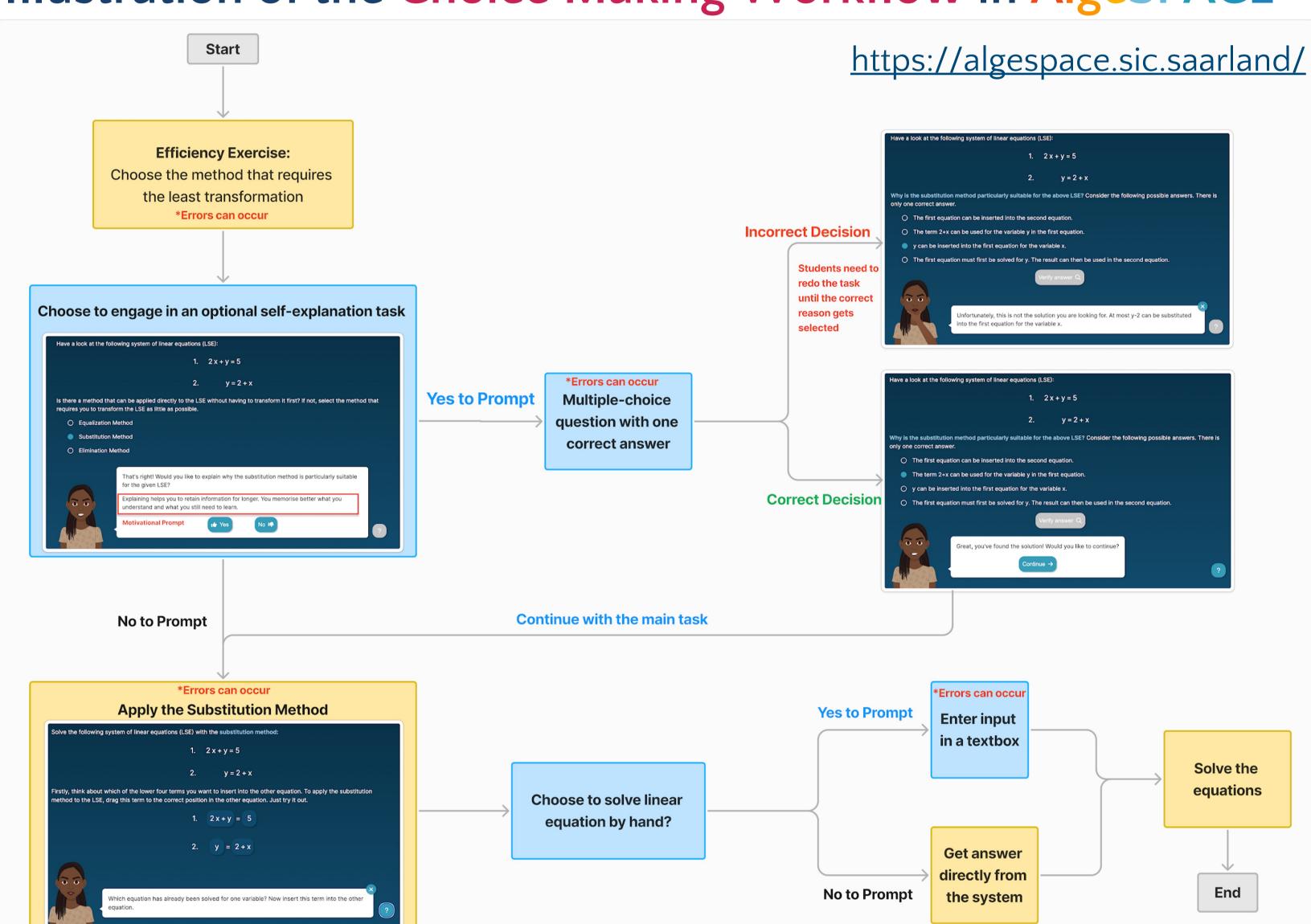
# Investigating the Effects of Motivational Agents on Student Learning and Choice Making in an Adaptive Learning System

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# SRL and Choice Making in Adaptive Learning Systems

Within Zimmerman's cyclical Self-Regulated Learning (SRL) model [1], choice-making bridges the forethought, performance, and self-reflection phases. It operationalizes this transition as the moment when learners act on monitoring by deciding, for example, whether to attempt an optional task, change their problem-solving approach, or revisit a resource. SRL research in adaptive learning systems has largely focused on goal-setting [2], self-monitoring [3], and help-seeking [4], while choice-making remains an understudied but essential aspect of SRL [5].

# Illustration of the Choice Making Workflow in AlgeSPACE



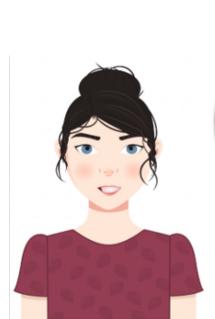
## Student Learning and Choice Making Over Time



**10th graders in the Agent condition** increasingly engaged with optional tasks over time, showing greater readiness to strategic choice-making.

# **Our Study**

- 1. Focus on **choice-making** as a central SRL construct. It is measured as the frequency of engagement with optional tasks in AlgeSPACE, an adaptive learning system developed by the LaLa Lab.
- 2. Involve "motivational agents": pedagogical agents (PAs) who deliver real-time motivational prompts [6].
- Aesthetically, the motivational agents were designed to be 2D, simple, human-like characters; take on the role of knowledgeable mentors [7].
- 4. Theoretically, the agents were designed to deliver motivational prompts based on Expectancy-Value Theory (utility value, attainment value, etc) [8]. For example, to motivate students to choose the optional self-explanation and manual calculation tasks:



"When you explain your solutions, you can immediately see where you still have uncertainties and what you still need to practise." [Utility value]

"Manual calculations are required in many exams. Regular practice prepares you optimally." [Attainment value]



5. Methodologically, the study involved 49 German school students (Grades 9–10) in a pre-posttest design experiment. Participants were randomly assigned to one of two conditions: an Agent condition with motivational agents, or a Non-Agent condition without agents. The system logged students' task choices, correctness of responses, and response times.

- RQ1: What impact do motivational agents have on students' conceptual understanding in algebra?
  - RQ2: How do motivational agents influence students' choice-making behaviors over time?