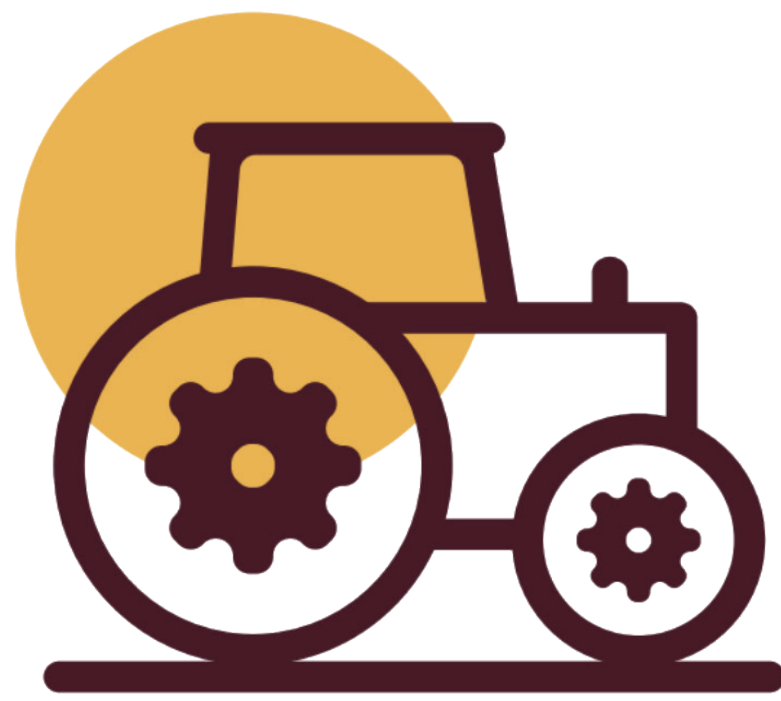




emancipation

Top learnings about impact

Measured Outcomes:

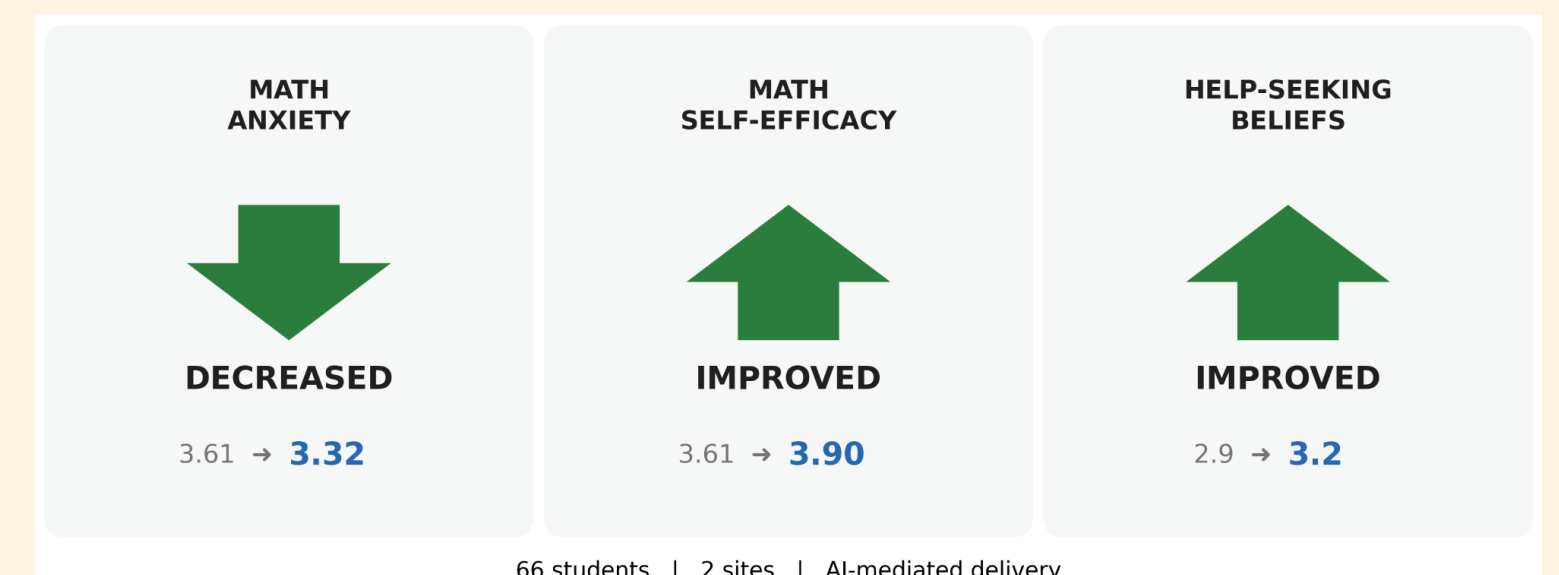
- **Negative Emotions DECREASED: 3.61 to 3.32.** Students entered sessions with less dread after experiencing AI support during struggle.
- **Math Capability Beliefs IMPROVED: 3.61 to 3.90.** Persisting through difficulty with AI scaffolding translated into increased confidence.
- **Help-Seeking Beliefs IMPROVED: 2.9 to 3.2.** The AI normalized receiving support, removing a barrier to accessing help.

Insights For AI-Mediated Math Narrative Deployment:

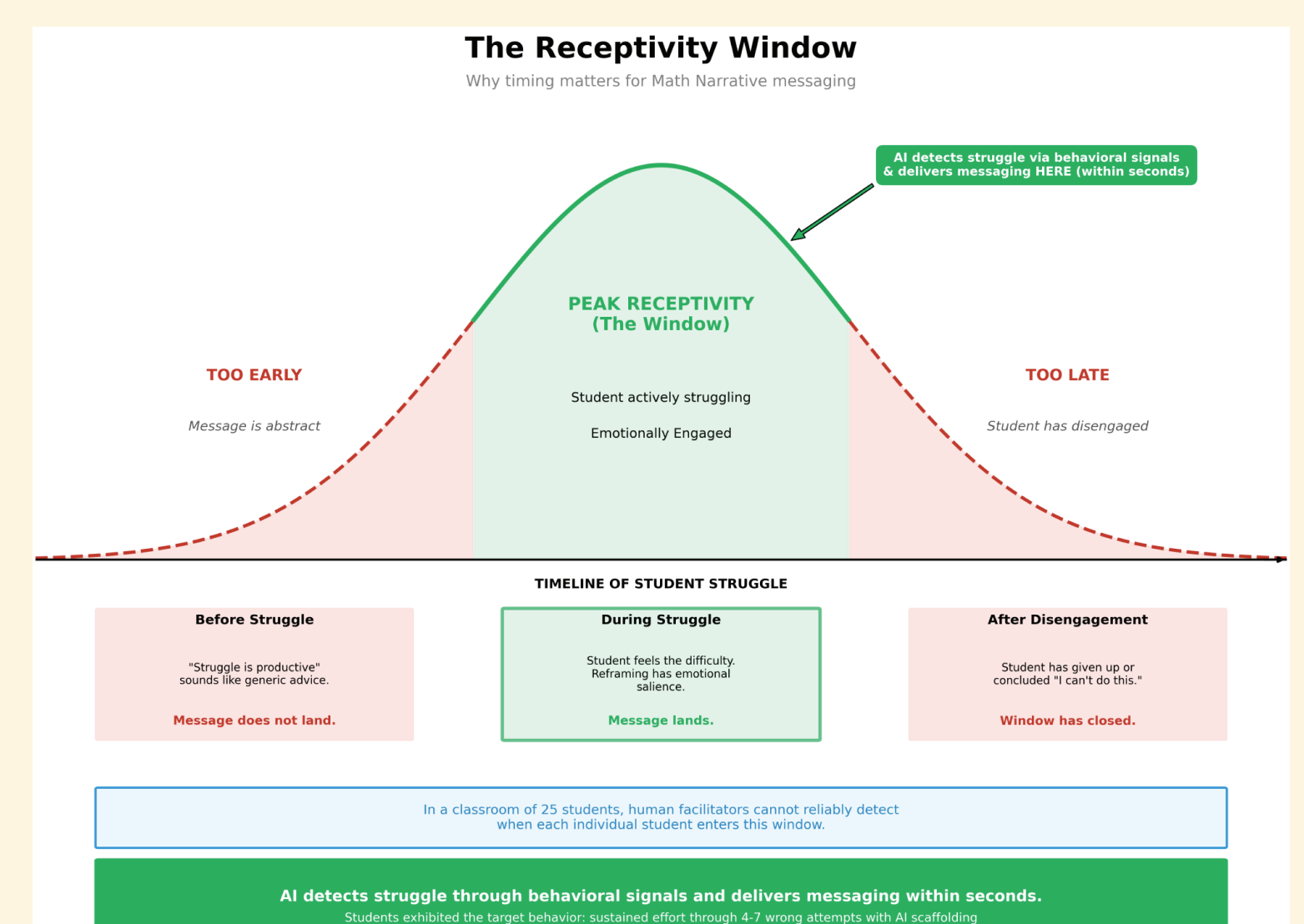
- 1. Deliver narrative at the moment of struggle.** AI can detect difficulty through behavioral signals and respond within the student's peak receptivity window. This is the ideal window for intervention that human facilitators cannot leverage at scale.
- 2. Build detection and adaptation layer into AI.** Uniform messaging sometimes produces negative shifts in students, so AI must assess a student's initial beliefs and adapt.
- 3. AI eliminates the social cost of failure.** Private, non-judgmental AI-mediated interaction removed the shame barrier that classroom settings cannot: peer observation of mistakes. Students persisted through 4-7 consecutive wrong attempts until reaching correct solutions, and 6% converted from active hostility with the chatbot to genuine mathematical engagement within a single session. AI does not require students to be braver, it removes the condition that demands bravery.

About our project

We embedded Math Narrative messaging (Reframe Struggle and Capability) in an AI tutor within a video game. The AI delivered real-time scaffolding at the moment of mathematical struggle. Across 66 students at two sites, we measured decreased math anxiety, improved self-efficacy, and increased help-seeking beliefs.



Mediated Narrative Delivery



Peak Receptivity Window



Narrative Deployment Sample

Top learnings about process

AI-mediated interventions generate behavioral data that self-reporting might miss. Students exhibited the target behavior: sustained effort through 4-7 wrong attempts, with continued engagement until arriving at correct solutions. Behavioral metrics provide real-time feedback for intervention refinement, whereas other data collection mechanisms over rely on self-awareness which may not reflect student growth in real time. This positions AI-mediated behavioral data as the primary growth measure, with self-reporting serving as confirmation.

Watch the game walkthrough:



Explore more data about our results:

