simSchool Overview

Virtual Human Simulation Environment for Education and Behavior Training

Overview of Problem Space

- Effective teaching requires practice, and obtaining practice is costly, hard to measure, and difficult to repeat and scale.
- Often the "norms" established in local classrooms do not represent the most modern approaches to instruction. Unseating these practices in local populations is difficult, often because of educator fear and reluctance because practicing new strategies with live students presents risk.
- Training experiences that lack personal context (i.e. are perceived as too general and not relevant to local realities and cultural factors) are often refused by educators.
- On-going training opportunities for pre-service and in-service educators is often cost and location-prohibitive in highly rural and under-resourced populations.

How do we train more educators with greater transparency, efficiency, and effectiveness over great distances when obstacles are significant and resources scarce?

Leverage technology.

simSchool

What is simSchool?

- A 10-year old flexible, web-based simulation operating at scale
- Created by educators and researchers for educators
- A safe space where educators and others can explore both old and new strategies in a no-risk innovative way
- A validated technology in which artificially intelligent virtual humans behave in highly complex ways, reflecting cognitive, social, emotional, and physical dimensions
- An open-ended, unscripted space with embedded open content authoring enabling an infinite number of virtual humans and instructional scenarios to be rendered

How does it work?

- Artificial Intelligence draws upon accepted frameworks of cognition, emotion, and learning to drive the behaviors of the sim students
- AI engine has been vetted through continuous research, field testing, and clinical practice
- simSchool can model over ***10 trillion*** **different unique student profiles** and **unique instructional tasks**

Models of cognition, emotion, and behavior used to drive the underlying algorithms include:

- Cattel Horn Carroll
- OCEAN model of psychology (Costa, McCrae)
- Interpersonal Circumplex Theory (Leary)
- Zone of Proximal Development (Vygotsky)
- Expectation States Theory (Berger)
- Triadic reciprocal causation (Bandura)
- Structural functional and Social Constructivist theories of learning (various)
- Health as a mitigating factor (various)
- Language acquisition and application (various)

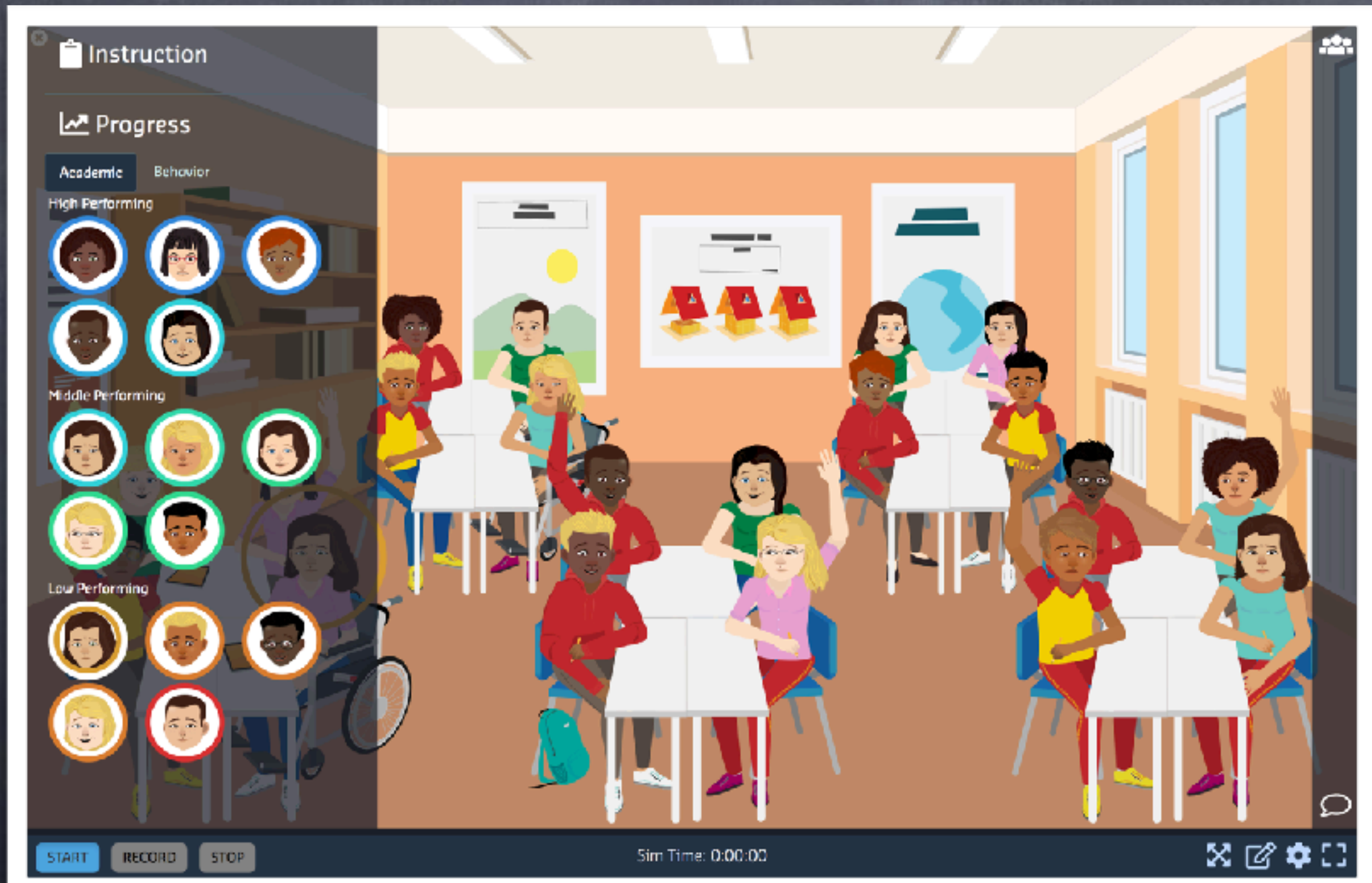
How do users access the simulations?

on mobile, tablet, and desktop devices
(any browser, any platform)

through a dedicated website - or - through
LMS integration

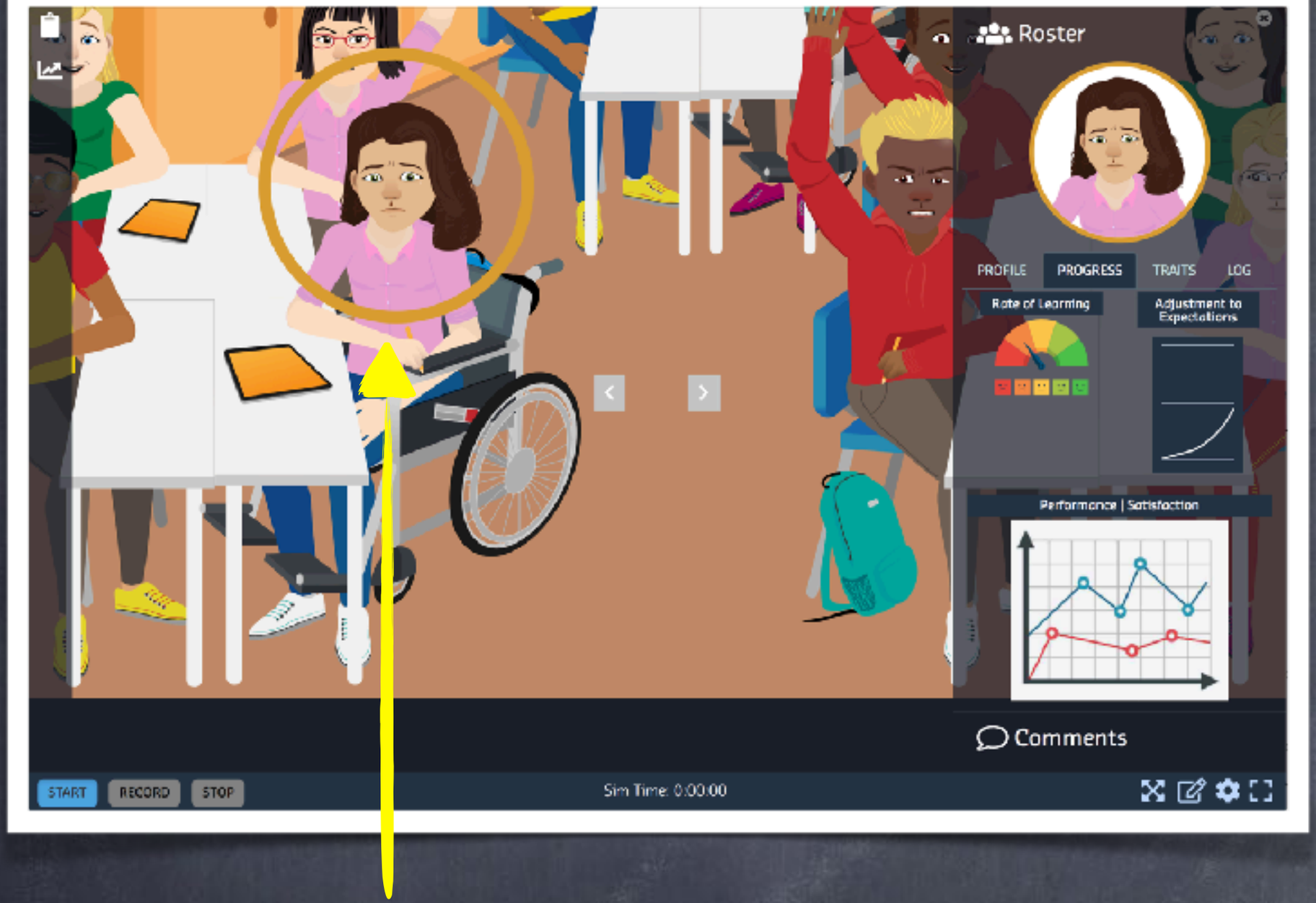
with low bandwidth required

What do educators do in simulations?



Experiment with new strategies and resources:

Teachers may experiment with strategies, tasks, and resources



Gain insight into student needs:

Teachers may view real-time data on how each student is relating to classroom expectations.

Observe whole class performance:

Teachers may view real-time data on how each student compares academically and behaviorally.

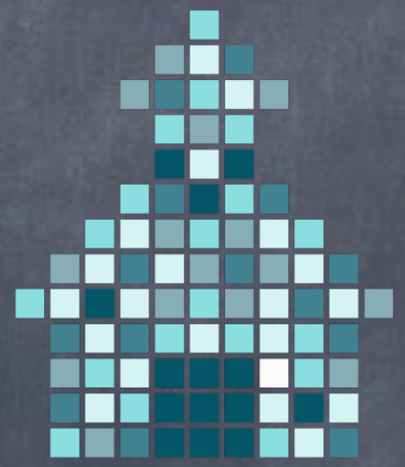
Explore the impact of conversational choices:

Teachers may choose varied comments and tones to observe the impact on student emotion and performance.

Experiment with varied classroom configurations
and how they may impact learning and behavior.

Experience **different regions and local situations.**

Simulations may be dynamically customized to reflect local demographics, social relationships, language, class setting, appearance, and other factors.



Is it useful?

(i.e. Are there predictable, measurable outcomes from practicing in simSchool?)

Research-validated* outcomes include:

- increased confidence in teaching
- increased technology self-efficacy
- increased knowledge of instructional strategies
- increased knowledge of classroom management techniques
- increased retention in teaching profession
- increased understanding of student cognitive, emotional, and cultural differences

*Christensen, Rhonda & Knezek, Gerald & Tyler-Wood, Tandra & Gibson, David. (2011). simSchool: an online dynamic simulator for enhancing teacher preparation. IJLT. 6. 201-220. 10.1504/IJLT.2011.042649.

Predictable results at increments of use:

90 minutes of use:

*a **change in attitude** about using games and sims in teaching*

4-6 hours of use:

***increase** in general knowledge about classroom management, differentiating instruction, and confidence as a teacher.*

12 hours of use:

*a dramatic **change in Locus of Control** and an **understanding** of student learning, emotional, and cultural differences*

All results cited have been replicated and published in peer-reviewed research journals. Additional studies are available on request and are searchable online.

Select studies published 2017-2018 include:

SimSchool: An opportunity for using serious gaming for training teachers in rural Areas, T Tyler-Wood, M Estes, R Christensen, Rural Special Education Quarterly, 2017

Simulated Apprenticeship for Pre-Service Filipino Teachers, C Medula, World Journal on Educational Technology: Current Issues, v9 n2 p89-97 2017

A Multi-University: Use of simSchool to Increase Pre-Service and In-Service Teachers' Understanding of the Use of Differentiated Instruction and the Understanding of Classroom Management and Behavior; V Johnston, D Collum, Society for Information Technology & Teacher Education, 2018

The Heuristic Sandbox: Developing Teacher Know-How Through Play in **simSchool**, S Hopper, Journal of Interactive Learning Research, 2018

Additional benefits to simschool-based training include

- Exposure to and a deep understanding of the emotional needs of individuals
- An understanding of cognitive performance and how it is impacted by emotion
- An understanding of social dynamics between individuals
- An ability to adapt instruction within a domain to address individual and whole group needs
- An ability to process meaningful data on personal performance and self reflect on insights
- An ability to experience frustration and build resiliency
- A no-risk space in which to expose, and reflect on, personal bias in working with various types of students

Teacher reflection, Rural United States:

"simSchool did a fantastic job in helping me understand the needs of diverse learners. Comparing the online experience to real life experience, I believe that simSchool hit it dead on. I was given different tasks and options to give students when trying to teach them. This is exactly like a real classroom: I would provide multiple different tasks to meet the needs of my diverse learners.

SimSchool also gave me this option just like a real-life classroom setting. **I think my understanding of the needs of diverse learners has increased dramatically; which surprised me since it isn't even a real classroom."**