

VIRTUAL PATIENT SIMULATOR: ELEVATING CLINICAL REASONING THROUGH GEN AI

Introduction

The Virtual Patient Simulator is a standalone application for nursing and healthcare students to practice clinical consultation skills through AI-powered encounters. Students engage in real-time conversations, perform history-taking, order tests, interpret results, and submit structured assessments. Built using HTML, JavaScript, and Google Apps Script, the app utilizes an LLM and Deepgram. Compared to traditional case studies, the interaction in this simulator provides immediate practice supporting clinical reasoning, confidence, formative feedback, and real-world readiness.

THE PROBLEM: TRADITIONAL STATIC CASE STUDIES Limitations of Passive Learning & Disengagement

Passive Learning

Disengagement



Traditional static case studies act as artifacts rather than active experiences, leading to disengagement during the analysis process

Weak Clinical Questioning

Multiple questionns



Students struggle to formulate effective inquiry strategies when answers are pre-provided in a text block

Limited Practice



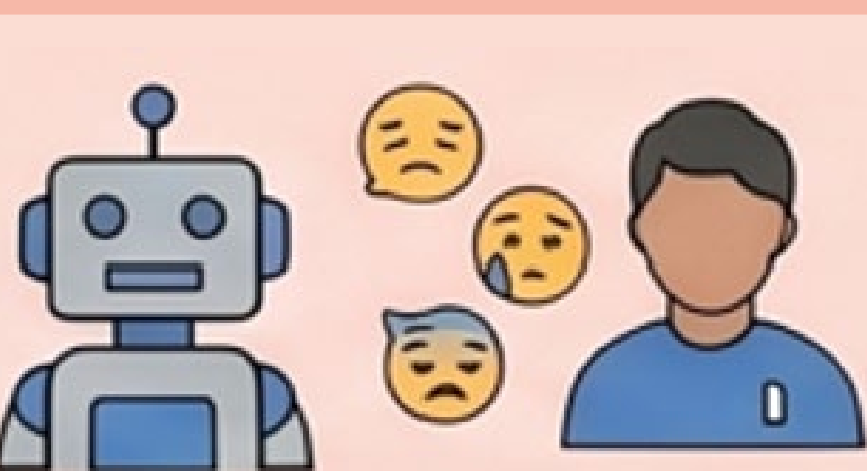
A lack of authentic, repeatable scenarios prevents students from "rehearsing" for the profession in a safe environment

Inconsistent Feedback



Delayed evaluation from lecturers hinders student reflection and the development of higher-order thinking

Eroding Humanistic Skills



Static cases cannot simulate the complexity of patient emotions, cultural nuances, or communication barriers like medical jargon confusion

THE IMPACT: MEASURABLE OUTCOMES & READINESS Preliminary Findings from Beta Testing

Theory-Practice Connection



Students reported a significantly stronger ability to connect classroom theory to clinical practice through independent exploration

Validated Usefulness & CBL Effectiveness



A majority of students confirmed the tool's effectiveness for case-based learning and clinical readiness

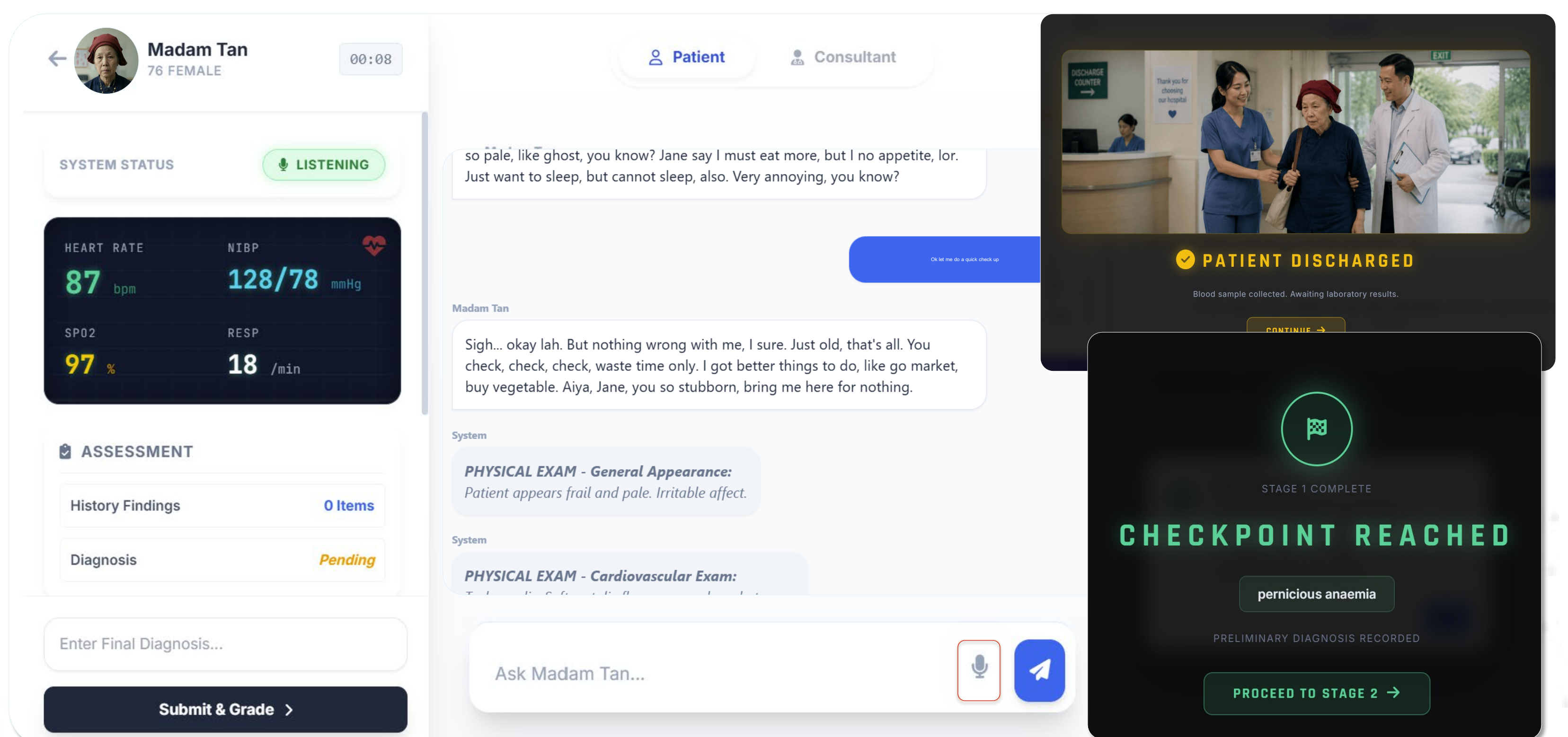
Critical Thinking Boost



Majority of participants confirmed the simulator improved knowledge construction and confidence in diagnostic reasoning.

High-Fidelity Realism

Students strongly agreed that the visual and interactive elements felt realistic, allowing them to identify gaps in their knowledge through authentic dialogue



No AI (Static case)



Reading 'static artefacts' and text descriptions.



Manual requests via email to the lecturer.

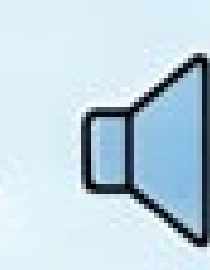


Limited, subjective feedback on findings.



Restricted to office hours/lecturer availability.

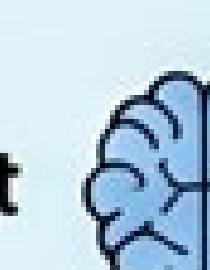
With AI (Gen AI Virtual Patient)



Immersive voice and chat with an authentic persona



Automated delivery of dynamic lab results upon request.



AI-driven 'first-pass' evaluation using Calgary-Cambridge rubrics.



Strict Socratic mode; AI guides via questioning only.



Scalable 24/7 instant feedback loop for continuous learning.

Patient Interaction

Data Acquisition

Assessment

Guidance Style

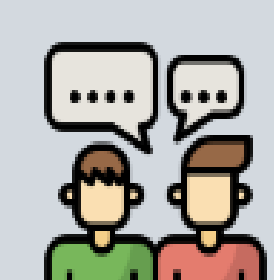
Availability

STUDENT'S QUOTES

"It replicated a real-world kind of dialogue for me to critically think and come up with follow-up questions along with tests to order."

"It promotes self-directed learning and helps solidify in-class learning."

LEAN DEVELOPMENT TEAM



Built by a 2-person SP team with no external vendors.

Concept to prototype: 1 month
Tools used: Google Gemini, Claude