

1. Introduction

Actors are increasingly required to rehearse independently due to scheduling constraints and limited access to scene partners. Existing tools such as Script Rehearsal provide only static line prompting, lacking the interactive responsiveness central to effective dialogue memorisation.

This project investigates whether AI can provide context-aware, human-like support for actors practising scripted dialogue independently.

2. Research Question

"Can AI be leveraged to provide context-aware, life-like support for actors practising scripted dialogue alone?"

3. Aims & Objectives

Aim: To critically investigate how AI-driven conversational systems can support scripted dialogue rehearsal.

1. Evaluate existing AI-driven systems for suitability as virtual scene partners.
2. Examine how AI can support dynamic responses to scripted dialogue.
3. Analyse research comparing AI-assisted and human interaction in learning.
4. Reflect on technical, creative, and ethical considerations.

4. Methodology

- **Philosophy:** Positivism — observable, measurable outcomes
 - **Approach:** Deductive — predefined evaluation criteria
 - **Strategy:** Experimental — controlled performance test
 - **Data:** Semantic accuracy test + Likert usability survey (n=8)
- All participant data anonymised in accordance with UK GDPR.

- [1] N. Reimers & I. Gurevych, "Sentence-BERT," EMNLP-UNLP, 2019.
[2] M. Foosherian et al., "Pipeline-Based Conversational Agents," ACL, 2023.
[3] J. M. J. Murre & J. Dros, "Ebbinghaus Forgetting Curve," PLOS ONE, 2015.
[4] A. Konecny et al., "Racial disparities in ASR," PNAS, 2020.

5. System Architecture — Four-Stage Pipeline

A pipeline-based architecture was chosen over an agentic LLM to ensure complete fidelity to the uploaded script — every response is retrieved, never generated.

**STAGE 1
Speech-to-Text**
Web Speech API — browser-native ASR. Custom Android deduplication post-processing.

**STAGE 2
Semantic Matching**
SBERT (all-MiniLM-L6-v2) via FastAPI. Fallback: Jaccard + Levenshtein edit distance.

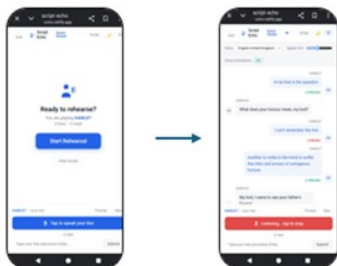
**STAGE 3
Response Selection**
Configurable thresholds. Match → advance + XP. No match → corrective feedback.

**STAGE 4
Text-to-Speech**
Web Speech Synthesis API. Stage directions stripped before synthesis.

Figure 1 — Script Echo conversational pipeline

6. Technology Stack

React Vite Netlify Web Speech API
SBERT all-MiniLM-L6-v2 FastAPI Python
Firebase Firestore Firebase Auth



7. Semantic Matching Accuracy

Controlled test: 20 scripted lines delivered to Script Echo vs a human scene partner baseline.

90%

Script Echo accuracy

VS

95%

Human scene partner baseline

Figure 2 — Accuracy: Script Echo vs human baseline

The gap is primarily attributable to speech recognition misrecognition rather than failures in semantic interpretation.

8. Usability Survey Results (n=8)

Participants from acting backgrounds rated the system on a 1–5 Likert scale.



Figure 3 — Mean Likert ratings across usability dimensions

100%

would use Script Echo again

62%

rated equal to or better than a human partner

9. Comparison With Human Scene Partner

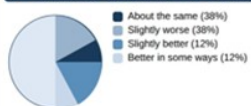


Figure 4 — Scene partner comparison (n=8)

62% of participants rated Script Echo as comparable to or better than a human scene partner. No participant rated it as much worse.

10. Conclusions & Future Work

Script Echo demonstrates that a pipeline-based AI system can serve as an effective independent rehearsal tool, achieving 90% semantic matching accuracy against a 95% human baseline, with 100% of participants indicating intent to reuse the system.

- Replace Web Speech API with a purpose-built ASR model for improved accent robustness
- Deploy FastAPI to a public cloud host for full mobile SBERT access
- Incorporate spaced repetition scheduling based on the Ebbinghaus forgetting curve

Scan to try Script Echo on your phone
script-echo.netlify.app

