# [ANNA HE][賀安娜]

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## EDUCATION

**East China Normal University (華東師範大學, 985)**

M.Eng. in Computer Science and Technology | GPA: 3.44/4.00                              Sep 2023 - present

**Nanjing University of Aeronautics and Astronautics (南京航空航天大學, 211)**

B.Eng. in Software Engineering | GPA: 3.3/5.00                              Sep 2019 - Jul 2023

## PUBLICATION

Zheng, L.*, **He, A.**, Qi, C., Zhang, H., & Gu, X. (2025). Cognitive Echo: Enhancing think-aloud protocols with LLM-based simulated students. *British Journal of Educational Technology, 56*, 2019–2042. (SSCI Q1, IF-2025=8.1) *: Supervisor.

Zheng, L.*, **He, A.**, Qi, C., Hu, B., Gu, X., & Hong, D. (2025). Cognitive echo: The think-aloud protocol for simulated student agents. *Journal of East China Normal University (Education)*, *43*(5), 30–43. (CSSCI, in Chinese) *: Supervisor.

**He, A.**, Zheng, L.*, Qi, C., Xu, H., Zhang, H., Liu, T., Hong, D., Dai, Y., Guan, J., & Gu, X. (n.d.). Structured student error simulation: A cognitive path generation framework integrating chain-of-thought reasoning and model-tracing. *IEEE Transactions on Learning Technologies.* (SCI Q1, SSCI Q1, IF=4.9. Under Review)

**He, A.**, Zheng, L.*, Xu, H., Qi, C.& Hong, D. (n.d.). Resonating with student cognition: Leveraging LLMs and a working memory-focused dataset for agent-based simulation. *In Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP).* (CCF B. Under Review)

Qi, C., Zheng, L.*, **He, A.**, Xu, H., Jia, L., Wei, Y., Jiang, B., & Gu, X. (n.d.). Simulating student learning behaviors with LLM-based role-playing agents: A data-driven and cognitively inspired framework. *Expert Systems with Applications.* (Under Review)

Liu, T., Zheng, L.*, Gu, X., Qi, C., Xu, H., Jiang, B., & **He, A**. (n.d.). Modeling how learners learn: Providing personalized strategy support via deep reinforcement learning. *International Journal of Educational Technology in Higher Education.* (Under Review)

## RESEARCH EXPERIENCE

**Cognitive Echo: Enhancing Think-Aloud Protocols with LLM-Based Simulated Students**    Aug 2024 – Dec 2024

*DOI:* https://doi.org/10.1111/bjet.13590
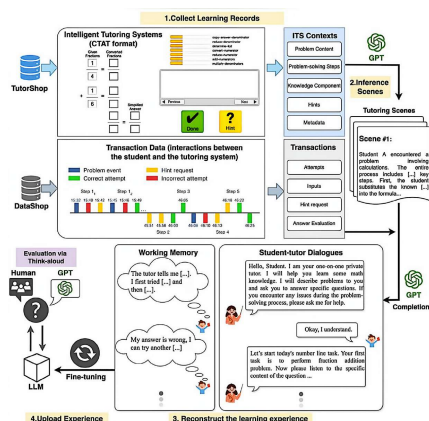


- Proposed the Cognitive Echo framework integrating LLM-based student agents with think-aloud protocols.
- Built 2,850 teacher–student scripts to ensure realistic knowledge representation.
- Fine-tuned Qwen2-7B with LoRA to model learners at different proficiency levels.
- Designed a think-aloud-based evaluation framework showing improved cognitive realism, level distinction, and reduced hallucination.

## Structured Student Error Simulation: A Cognitive Path Generation Framework Integrating Chain-of-Thought Reasoning and Model-Tracing

Apr 2025 – Aug 2025
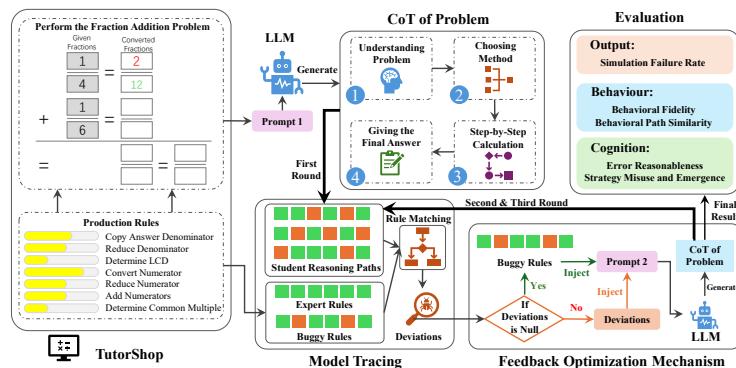


- Proposed the SES framework integrating Chain-of-Thought and Model-Tracing to simulate realistic student error paths.
- Built a dataset of 331 math problems with expert and buggy rules, and applied multi-round reasoning with LLMs.
- Designed a three-dimension evaluation showing SES enhances error stability, fidelity, and interpretability for educational applications.

## Resonating with Student Cognition: Leveraging LLMs and a Working Memory-Focused Dataset for Agent-Based Simulation

Apr 2024 – Oct 2024
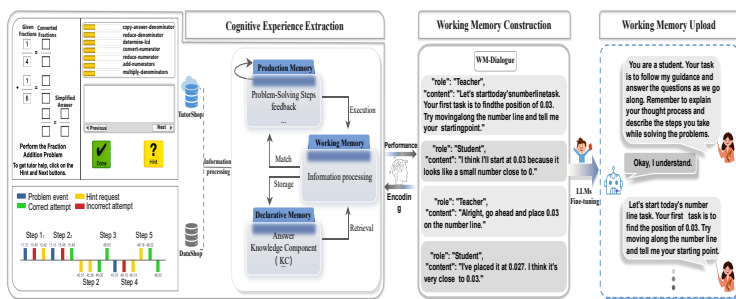


- Built WM-Dialogue, a dialogue-style dataset from ITS logs modeling working-memory processes.
- Fine-tuned multiple LLMs to simulate step-by-step reasoning and realistic cognitive errors across proficiency levels.
- Evaluated agents with accuracy and cognitive-behavior rubrics, showing improved level distinction and interpretability over baselines.

## Cognitive Echo: The Think-aloud Protocol for Simulated Student Agents (in Chinese) Jul 2024 – May 2024

*DOI:*
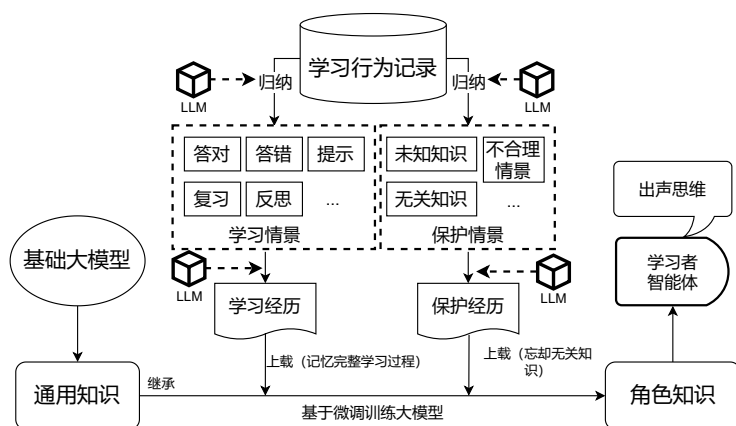


- Built a think-aloud dataset capturing students' self-verbalized reasoning in structured learning scenarios.
- Fine-tuned multiple LLMs to simulate level-specific student cognition.
- Designed a five-dimension evaluation rubric showing fine-tuned agents achieved higher cognitive realism and consistency.

## AWARDS AND HONORS

Postgraduate Academic Scholarship (2023, 2024)

University Honor: Outstanding Volunteer (2022)

University Honor: Excellent League Member (2021)

University Honor: Merit Student (2021)

Outstanding Student Scholarship (Third-Class) (2021)

Undergraduate Academic Scholarship (Second-Class & Third-Class) (2020–2021)

## SKILLS

**Programming Languages:** Python / C++ / C / Java

**AI & LLM Skills:** Large Language Model fine-tuning / Prompt Engineering / Chain-of-Thought reasoning / Model Evaluation / Dataset Construction