

An LLM-Guided Tutoring System for Social Skills Training

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Abstract

Social skills training targets behaviors necessary for success in social interactions. However, traditional classroom training for such skills is often insufficient to teach effective communication — one-to-one interaction in real-world scenarios is preferred to lecture-style information delivery. This paper introduces a framework that allows instructors to collaborate with large language models to dynamically design realistic scenarios for students to communicate. Our framework uses these scenarios to enable student rehearsal, provide immediate feedback, and visualize performance for both students and instructors. Unlike traditional intelligent tutoring systems, instructors can easily co-create scenarios with a large language model without technical skills. Additionally, the system generates new scenario branches in real time when existing options do not fit the student’s response.

Introduction

In today’s rapidly evolving digital era, twenty-first century skills like communication and social skills have become critical (Battelle 2019), enhancing employee engagement and productivity (Herrity 2024; Thornhill-Miller et al. 2023). However, traditional classroom training for such soft skills is often insufficient to teach effective communication to deal with many real world scenarios. Such programs usually comprise a structured curriculum that often lacks the dynamics of the real-world environment within which these skills are effective and applicable. AI-powered tools can bridge this gap by providing students with interactive, real-world scenarios, evaluate performance, and offer targeted feedback to further enhance their skills. Moreover, such AI tools can be effectively developed with an instructor-in-the-loop to help build or tailor domain-specific exercises.

Recent breakthroughs in large language models (LLMs) demonstrate their potential for conversational training and narrative generation. For instance, GENEVA (Leandro et al. 2024) uses LLMs to create graphs for branching narratives in dialogue-based role-playing games, allowing conversations to adapt dynamically within predefined constraints. Other work uses LLMs to simulate realistic agent behavior with complex social interactions in real time (Park et al.

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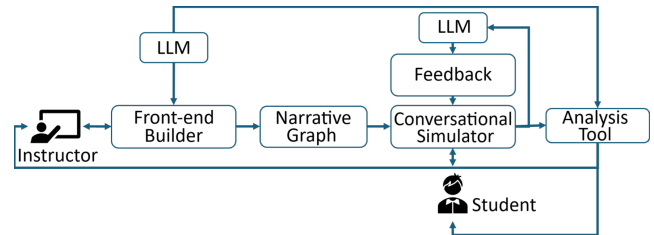


Figure 1: GLOSS: Block Diagram

2023). Moreover, Sun, Zhan, and Such (2024) suggests that personalizing conversational agents with individual personas enhances realism and engagement in training simulations. These applications show how LLMs can create adaptive and interactive environments for social skills training, providing realistic and context-specific scenarios for learners.

Social skills training (SST) (Tenhula and Bellack 2008) focuses on improving key behaviors necessary for success in social interactions. Behavioral SST methods include instruction, modeling, behavior rehearsal, feedback, and reinforcement, often combined with interpersonal problem-solving and social perception skills training. These skills are rarely taught using intelligent tutoring systems (ITSs), which provide immediate, customized instruction, or feedback. Previous work has used ITSs to teach counseling skills to U.S. officers (Georgila et al. 2019), assist children with social challenges (Sanchez et al. 2014), train social skills (Tanaka et al. 2023), and develop interpersonal and intercultural skills (Lane et al. 2007).

This paper introduces a framework that leverages LLMs to train social skills. In contrast to traditional ITSs, our system empowers human instructors to dynamically design realistic situations, provides online scenarios for students to navigate, supports student rehearsal, offers immediate feedback, and includes a visualization tool for delayed feedback. Furthermore, unlike previous approaches, our system allows instructors to easily create and modify scenarios without programming expertise, providing the flexibility to tailor training to students’ personalized needs and specific learning objectives.

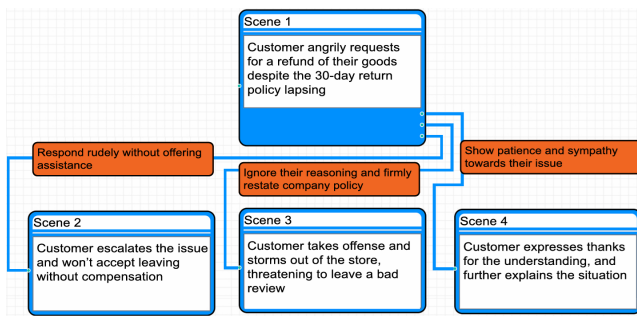


Figure 2: Narrative graph for customer service example

Guided Learning for Optimizing Social Skills

Our proposed framework, Guided Learning for Optimizing Soft Skills (GLOSS) is shown in Figure 1. It consists of a front-end builder that allows an instructor and LLM to collaboratively build a narrative graph, which summarizes all possible interactions within the relevant scenario. When the student practices soft skills, a conversational simulator is used to show relevant dialogue from the scenario, either specified by the instructor or generated by the LLM along with appropriate feedback for the student’s response. We implement various components of GLOSS using GPT-4.

Front-end builder: The front-end builder enables instructors to design scenarios that simulate students’ interactions with people in a specific domain, such as handling an angry customer. Instructors can choose to use a pre-built template with scripted dialogue, create a scenario from scratch, generate a scenario using a prompt to an LLM, or combine these methods. Additionally, instructors can implement open-ended training scenarios, which offer higher training value but have traditionally been avoided due to the increased assessment load. This flexibility reduces content creation time, allowing for the development of more complex and realistic scenarios tailored to learning needs.

Narrative graph: The narrative graph (Figure 2) serves as the visual interface of the front-end builder, providing a graphical representation of all possible interactions within a scenario. Each node of the narrative graph represents a specific scenario, and the edges define the transition to the successor scenario based on the user’s (student’s) response. For example, when handling an angry customer, the student might be patient, respond rudely, or ignore the complaint, leading to different successor scenarios within the narrative graph. The graph illustrates these options along with the corresponding reactions from the customer for each choice. Narrative graphs can be as detailed and complex as needed, allowing instructors to model a wide range of interactions and responses based on the training objectives. Instructors can add, delete, or modify nodes and edges in the narrative graph to tailor a scenario to be simple, complex, or appropriately aligned with a student’s skill level.

Conversational simulator and feedback: The conversational simulator (Figure 3) is an interface for students to practice specific training scenarios from the built-in narrative graph. The student can enter their response through



Figure 3: User-interface for GLOSS

a text box or a microphone. Using the front-end builder, the instructor defines whether the dialogue should be strict and constrained, requiring precise phrasing, or more flexible, allowing the avatar (powered by the LLM) to generate dynamic, novel dialogues on the fly by mapping specific paths within the narrative graph. Furthermore, the system supports the automatic, dynamic generation of new paths in the narrative graph when existing options do not align with the user’s response. These new transitions are added to the narrative graph by the LLM based on the intent of the user’s response. An avatar within the user interface reacts appropriately, simulating a real-world scenario. Feedback on the student’s response is provided through an LLM using an independent prompt, allowing the student to adjust their response based on the feedback received. The interface enables users to practice uncomfortable, emotionally charged situations or culturally sensitive scenarios to approach through regular role-playing, offering a safe training environment. These simulations can be accessed from a desktop on a web browser via WebGL, or through immersive VR experiences.

Analysis tool: The analysis tool visualizes a user’s training conversation by illustrating their path through the narrative graph, serving as a mechanism to provide delayed feedback (Hattie and Timperley 2007). Instructors can assess student responses and determine if the content generated by the system reflect training goals. Instructor-in-the-loop workflows can incorporate this feedback loop to iteratively improve the narrative graph. The analysis tool also enables students to reflect on their conversations with the simulator, allowing them to enhance their social skills and improve their performance during a post-training review.

Conclusion and Future Work

The GLOSS framework leverages LLMs to create an instructor-in-the-loop tutoring system aimed at training social skills. GLOSS enables instructors to dynamically design realistic scenarios for students to navigate, facilitating rehearsal, providing immediate feedback and evaluation, and visualizing performance for both students and instructors. Future work includes enhancing the avatar’s responses to student interactions and finding an optimal balance between fully scripted and open interactions. We also plan to refine immediate and delayed feedback mechanisms and conduct user studies to assess effectiveness for students and instructors (Paramythi, Weibelzahl, and Masthoff 2010).

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