

MAKING FRIENDS IN THE CLASSROOM, DEVELOPING ASSISTANTS WITH PERSONALITIES

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ABSTRACT

This study explores how we can use Large Language Models to build technological agents with distinct personalities. It proposes that these LLM-enabled chatbots can be a tool to extend the work currently being done with the Wizard-of-Oz methodology, and presents an instantiation to exemplify it. The instantiation explores how a friendly chatbot agent can be used to explore the influence that interactions with anthropomorphic technology can have over students' engagement and overall performance. The study finalizes with some considerations on how we can ensure the validity of interactions handled by the LLM.

INTRODUCTION

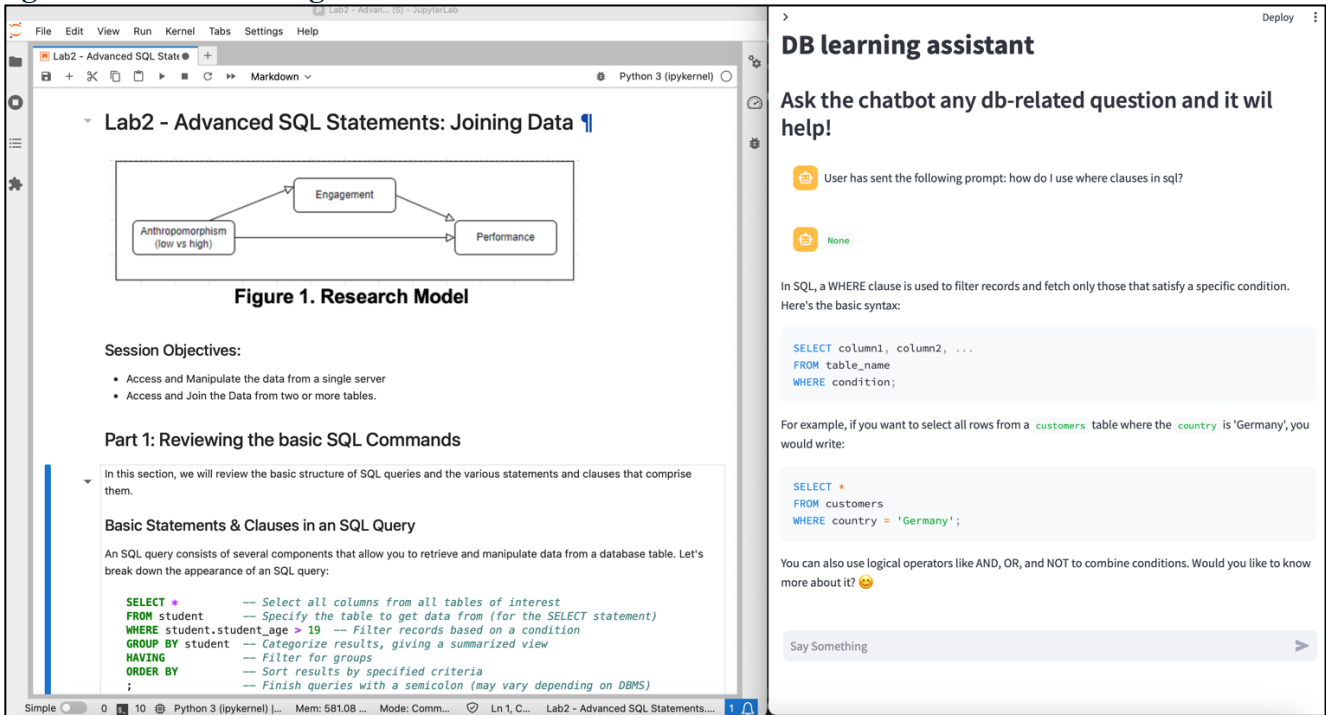
Anthropomorphism refers to the attribution of cognitive and affective mental state to non-human beings, objects, or concepts (Airenti, 2018). Within the field of information systems, it has been used to explore how users interact with technological systems that display human-like traits such as verbal communication in chatbots (Bracken, Jeffres, & Neuendorf, 2004), as well as non-verbal communication and apparent behavior in robots (Eyssel, Hegel, Horstmann, & Wagner, 2010). These studies have demonstrated that as users engage with technologies with apparent agency and emotion their interaction style becomes closer to that used in human-to-human interaction and they tend to attribute mental states to the technology (Gray, Gray, & Wegner, 2007). These changes in the interaction have been recorded as influencing individuals' intentions (Mandell, et al., 2015), performance (Wiese, Mandell, Shaw, & Smith, 2019), and their behavior and perceptions of the interaction (Mou, & Xu, 2017).

Despite its potential for information systems research, the complexity of designing functional human-like agents has limited researchers' capacity to study the construct with complex solutions, forcing them to rely on deceiving the participant by having the researcher handle complex tasks for the technology behind the scenes in an approach appropriately called Wizard-of-Oz (WoZ) methodology (Kelley, 1984). In this paper we argue that recent advancements in AI like Large Language Models (LLMs) could be used to create chatbots with realistic human-like interactions without the need for WoZ's deception.

METHODOLOGY

In this study we are using a design science approach (Peppers, et al., 2006) to develop one such system within an educational setting. The operationalization builds on the literature on student engagement which describes it as a multifaceted phenomenon with behavioral, emotional, and cognitive processes (Schindler, Burkholder, Morad, & Marsh, 2017) critical for student success (Lei, Chui, & Zhou, 2018). We argue that the effects of anthropomorphic agents on intentions, performance, behavior, and perceptions make them useful tools for supporting students. Specifically, we argue the following hypotheses:

Figure 1. Interface design and research model



- **Direct effects over learning performance:** Students supported by an anthropomorphic agent will both a) perform better in class assignments, and b) perceived their performance to be better regardless of actual grade when compared to a student with no agent support, or a student supported by a non-anthropomorphic agent. (Anthropomorphism to Performance).
- **Direct effects over performance:** Students supported by an anthropomorphic agent will both a) display, and b) exhibit increased levels of engagement with the class material when compared to a student with no agent support, or a student supported by a non-anthropomorphic agent.
- **Indirect effects over performance through engagement:** The increased engagement will lead to significant improvements in both a) actual and b) perceived performance.

To evaluate these hypotheses, we have developed a chatbot with customizable behavior, and modified a common class activity for a database administration course (i.e. writing queries) to be better integrated with the chatbot User Interface (UI). The operationalization is scheduled to be run in a classroom setting in spring 2024.

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