

Teaching the Teachers: What AI Student Agents Reveal About Preservice Teachers' Noticing in Statistics

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The growing importance of data science and AI in the United States has sparked a need to prepare students for these emerging fields (National Council of Teachers of Mathematics, 2024). One natural place is working with pre-service teachers to develop core ideas in statistics and data science. In particular, the ability of a teacher to notice and interpret student work is essential. To address this need, we created a series of instructional activities, which were designed to help pre-service teachers (undergraduate and graduate students in mathematics teacher education) understand and notice statistical thinking of K-12 students.

In this activity, pre-service teachers interact with an AI student. An AI student is a custom agent powered by generative AI that is given a profile and told to act as a student in the classroom. The AI students are given mathematical conceptions related to a task about mean, median, and mode as developed by research on real students. They are also given personalities, dispositions to mathematics, and preferred forms of communication. Our first trial of virtual students (Authors, under review) resulted in pre-service teachers being able to attend, interpret, and respond at high levels. The AI students also produced a wide variety of student thinking for the preservice teachers to analyze due to their nature of being powered by generative AI. We extend this work with this poster by designing a new set of AI students that will be used in a classroom of preservice teachers covering the topic of centers of a distribution. The chosen task is the screentime task (Virginia Department of Education, 2025) which asks students to explore centers of a distribution of a data set to remain under a screen time limit imposed by parents.

Data was collected includes video recordings of the students while they interacted with the AI students (Figure 1) over Zoom while they shared their screen, their chatlog, and a post-activity reflection. For this poster, we present our preliminary analysis of the AI student's reasoning through descriptive coding and thematic analysis (Saldana, 2013). In order to analyze the preservice teacher's noticing, we combined the FAIR framework (Louie et al., 2021) with the five types of representations (NCTM, 2014) We discuss some analysis of the preservice teacher's noticing with regards to the AI students including what mathematics they attend to and how they respond to the AI students. This study has implications for the pedagogical design of undergraduate mathematics education courses by providing tools and activities to make training practices low-stakes, sustainable, and scalable.

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