

USING PROCESS MINING TO ANALYZE TEACHER-STUDENT INTERACTION

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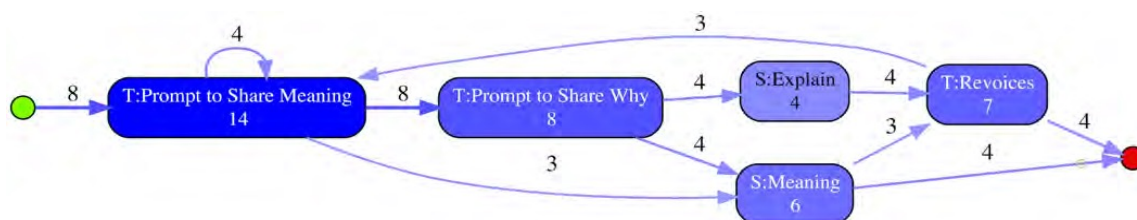
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Prevalent mathematics classroom observation tools do not currently capture “interactive nature of leading discussions—the timing of teaching moves is not always considered, and teacher actions and student actions are often coded separately so that teaching moves are not always linked with specific student responses” (Jacobs & Spangler, 2017, p. 784). In this poster, we share some of our exploratory work adapting process mining (Van der Aalst, 2012) into the educational context to address this need.

Underlying our project is the assumption that the classroom is a social system where the learning of mathematics depends on interactions between teacher, students, and content. The data analyzed in this report stems from a larger project analyzing student-teacher activity in the mathematics classroom (Melhuish, et al., 2020). We analyzed lessons from 31 middle school teachers from a large, urban school district in the Southwest United States. Each lesson was coded for: *teacher moves* that can serve to engender students in rich mathematics and *student contributions* reflecting standards-based mathematical practices (National Governors Association Center for Best Practices) along with corresponding time stamps to create an *event log*.

Educational process mining (EPM) “uses log data gathered specifically from educational environments in order to discover, analyze, and provide a visual representation of the complete educational process” (Bogarín, et al., 2018, p.1). The techniques involve analyzing logs of events (*activities*, *timestamp*, and other information such as actor or resource) to capture the most frequent events and paths. See Figure 1 for an example of a process (along with frequencies) mined from our data.



In this poster, we will share several common processes and illustrate how this research methodology has the potential to provide unique insights into classroom discourse analysis by unearthing processes beyond the traditional Initiate-Respond-Evaluate/Feedback patterns (Cazden, 2001).

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