Intelligent Tutoring Goes To School in the Big City

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Abstract: This paper reports on a large-scale experiment introducing and evaluating intelligent tutoring in an urban High School setting. Critical to the success of this project has been a client-centered design approach that has matched our client’s expertise in curricular objectives and classroom teaching with our expertise in artificial intelligence and cognitive psychology. The Pittsburgh Urban Mathematics Project (PUMP) has produced an algebra curriculum that is centrally focused on mathematical analysis of real world situations and the use of computational tools. We have built an intelligent tutor, called PAT, that supports this curriculum and has been made a regular part of 9th grade Algebra in 3 Pittsburgh schools. In the 1993-94 school year, we evaluated the effect of the PUMP curriculum and PAT tutor use. On average the 470 students in experimental classes outperformed students in comparison classes by 15% on standardized tests and 100% on tests targeting the PUMP objectives. This study provides further evidence that laboratory tutoring systems can be scaled up and made to work, both technically and pedagogically, in real and unforgiving settings like urban high schools.

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Two features of the intelligent tutoring situation shaped our approach to the problem: (i) Given that instruction must be made available in real time, inferences about mental state can only use data up to the current point in time. Although inferences of mental state may become clearer after observing subsequent student behavior, these later data are unavailable for real-time prediction. (ii) Model tracing algorithms are parameterized with pilot data and then used to predict the mental state of students in learning situations. Therefore, we trained our algorithm on one set of data and tested it... (1997) Intelligent tutoring goes to school in the big city. Int J Artif Intell Educ 8:30–43. OpenUrl.