2023-2024 HOLLOWELL MATHEMATICS EDUCATION SEMINAR:

Innovations in Research Methods

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Using AI and Eye Tracking to Identify Student Strategies: Insights Into Studies in Mathematics Education

NOVEMBER 1, 2023 | 10:00 – 11:00AM

https://xxxxxxxxxxxxxxxxxxxxx | **PASSWORD: xxxxxxx**

This talk presents an innovate approach to facilitate the analysis of eye-tracking data: Using artificial intelligence (AI) to support human researchers. Eye tracking is a promising research method in mathematics education that is becoming increasingly important. Interest in eye tracking has been fueled by recent technical developments that have made eye tracking easier to use for contexts with students, among other things. However, the analysis of eye-tracking data is complex, especially in qualitative analyses of student strategies and in studies with large numbers of participants. AI offers options for support. In this talk, I present our work in two studies in mathematics education where we used student gaze heatmaps in combination with AI. One study investigated student strategies in number line estimation; the other examined student strategies in small number enumeration. The talk illustrates the power of combining eye tracking and AI: In both studies, we were able to find meaningful strategies based on the suggestions of AI. Further, we were able to find significant group differences in strategy use by, for example, students with and without mathematical difficulties.

Prof. Dr. Maike Schindler is a full professor at the University of Cologne for mathematics in special education and inclusion. Her research focuses on learning difficulties in mathematics, mathematical creativity and giftedness, mathematical problem posing, and theories in mathematics education as well as on the use of eye tracking and AI in mathematics education research. A trained teacher, she taught for five years, including two years at a high school, one year at a primary school, and two years at a special needs school. She did her doctorate at the TU Dortmund University on the philosophical theory of inferentialism and its use in mathematics education research.

The Hollowell Mathematics Education Seminar series brings together an international slate of scholars to highlight advances in K-16 mathematics education research. Sponsored by the Department of Mathematical Sciences at the University of Delaware and the Kathleen and David Hollowell Professorship in Mathematics Education, the Hollowell series features recent innovations in mathematics education research methods. The seminar series will be hosted online through Zoom and is open to the public. We welcome and encourage faculty, students and all who have an interest in mathematics education to attend.

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