



Dissertation Defense
Doctor of Philosophy in Information Science

“Technology Supported Disciplinary Literacy” by Zak Risha

Date: December 9, 2025

Time: 2:30 – 4:30 p.m.

Place: Room 828, Information Sciences Building, 135 N.
Bellefield Ave Pittsburgh PA 15260

Committee:

- Dr. Erin Walker, Advisor and Associate Professor, Department of Computer Science, School of Computing and Information
- Dr. Rosta Farzan, Professor, Department of Informatics and Networked Systems, School of Computing and Information
- Dr. Lingfei Wu, Assistant Professor, Department of Informatics and Networked Systems, School of Computing and Information
- Dr. Emily C. Rainey, Associate Professor, Department of Teaching, Learning, and Leading, School of Education
- Dr. Doug Downey, Director of Semantic Scholar Research, Allen Institute for AI

Abstract:

The theory of disciplinary literacy argues that academic disciplines vary in the ways they use language, evaluate ideas, and disseminate knowledge. Success in reading and writing therefore requires more than general literacy skills, but also an understanding of unique disciplinary language and processes. While the theory of disciplinary literacy has led to calls and proposals for reforming educational policy and pedagogy, it seldom is used to inform the design of technology to teach and support literacy. I propose the idea of *technology supported disciplinary literacy* (TSDL), which describes technologies designed to help users acquire specific skills and knowledge to read and write in a discipline. Such technologies are designed by foregrounding the unique language, habits, and epistemology of domains of knowledge to support users in acquiring literacies.

My thesis explores how approaches in education technology can be applied in the context of disciplinary literacy. First, I introduce new technologies that aim to cognitively scaffold disciplinary literacies during the reading process of complex texts like computer code and poetry. Second, I present how TSDL can provide socio-cognitive and motivational support through a new collaborative technology for data literacy. Third, I consider the role of TSDL for users outside formal educational contexts. I share evidence suggesting that research teams of specialists from different disciplines struggle to integrate knowledge when collaborating together. Last, I build on these findings by investigating how disruptive AI technologies like ChatGPT can aid professionals and researchers in developing new disciplinary literacies. Through an exploratory user study, I investigate the ways ChatGPT supports researchers as they engage in a new, unfamiliar discipline. The study also describes patterns of user interaction, key aspects of human-AI collaboration, and potentials strategies for scaffolding user interactions in this context. The proposed work will help illustrate the literacy needs of this new population of researchers and describe an exciting new design space for technology supported disciplinary literacy.