From Analytics to Actions: Enhancing Feedback Practices in Inquiry-Based Discussion through Prescriptive Network Analytics

As the demand for cultivating students' higher-order thinking (HOT) intensifies in higher education, inquiry-based discussion (IBD) has emerged as a widely adopted pedagogical approach across disciplines. However, despite its potential to foster critical, reflective, and interactive discourse, the effectiveness of IBD is not guaranteed, as the quality of instructor feedback significantly influences how students understand and navigate the complex IBD process. Due to time and resource constraints, instructors face difficulties in monitoring student discussions and providing timely, actionable, and personalized feedback. While learning analytics (LA) offer promising solutions to provide instructors with fine-grained insights into IBD, their adoption in practice remains limited due to the data science expertise required. Consequently, many instructors miss the opportunity to leverage LA advancements, hindering their ability to provide quality feedback, which in turn limits students' engagement and development in IBD. Grounded in the community of inquiry (CoI) model, this project strives to bridge the gap between advanced LA and practical solutions that enhance instructors' feedback practices. Specifically, the project aims to: (1) develop a prescriptive network analytics (PNA) tool tailored for IBD feedback practices; (2) enhance instructor feedback practices with transparent analytics, interpretable insights, and adaptive recommendations; (3) improve student IBD engagement and outcomes through timely, actionable, and personalized feedback; and (4) establish a comprehensive IBD feedback framework integrating theoretical principles, analytical insights, and effective practices. This project will unfold in three phases. In phase 1, an exploratory study involving 25 instructors and 350 students will be conducted using surveys and interviews to identify specific needs for LA-assisted feedback. A prototype PNA tool will be developed following this phase. Phase 2 will employ a design-based research approach to iteratively design, implement, analyze, and refine the prototype through collaboration with four instructors in real-world educational settings. In phase 3, a quasi-experiment will be conducted with six instructors and their respective classes (240 to 360 students in total) to evaluate the effectiveness of PNA-assisted feedback practices. Quantitative, qualitative, and computational data will be collected and analyzed across phases 2 and 3. The significance of this project extends beyond the development of a single tool. By making theory-informed analytics more accessible and actionable for practitioners, the project aims to transform feedback practices in IBD, ultimately contributing to the more effective development of HOT in higher education.