We explored the level of technology utilization in supporting children with cognitive disabilities at schools, speech clinics, and with assistive communication at home. Anecdotal evidence, literature research, and our own survey of special needs educators in Central Florida reveal that use of technology is minimal in special needs classrooms even when scientific research has shown the effectiveness of video modeling in teaching children with special needs new skills and behaviors. Research also shows that speech and language therapists utilize a manual approach to elicit and analyze language samples from children with special needs. While technology is utilized in alternative and augmentative communications, many caregivers utilize paper-based picture exchange systems, storyboards, and daily schedules when assisting their children with their communication needs. We developed and validated three software frameworks to aid language therapists, teachers and caregivers in supporting children with cognitive disabilities and related special needs. The Analysis of Social Discourse Framework proposes that language therapists use social media discourse instead of direct elicitation of language samples. The framework presents an easy to use approach to analyzing language samples based on natural language processing. We validated the framework by analyzing public social discourse from three unrelated sources. The Applied Interventions for eXceptional-needs Framework allows classroom teachers to implement and track interventions using easy to use smartphone applications. We validated the framework by conducting a sixteen-week pilot case study in a special needs school in Central Florida. The LEXY framework allows for the development of a new class of alternative and augmentative communication tools that are based on conversational chatbots that assist children with special needs while utilizing a model of the world curated by their caregivers. We validated the framework by simulating an interaction between a prototype chatbot that we developed, a child with special needs, and the child’s caregiver.

Major: Modeling and Simulation

Educational Career:
Bachelor's of Electrical Engineering, BS, 1991, Jordan University of Science and Technology
Master's of Computer Engineering, MS, 1994, University of Wisconsin - Madison
Master's of Computer Science, MS, 1995, University of Wisconsin - Madison

Committee in Charge:
Charles E. Hughes, Chair, Computer Science
Lisa Dieker, College of Education
Valerie Sims, Psychology Department
R. Paul Wiegand, Department of Modeling and Simulation

Approved for distribution by Charles E. Hughes, Committee Chair, on March 6, 2018.

The public is welcome to attend.