
Workshopping Expressive Language Games for Children with Autism

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Abstract

This position paper describes the relevance of the authors' work to the SIGCHI 2014 workshop on Supporting Children with Complex Communication Needs. The authors are developing a suite of games to

encourage speech in children with autism spectrum disorders (ASD), 89% of whom receive some form of speech therapy at an early age [1]. By participating in this workshop the authors will be able to share findings from this project and receive feedback from a diverse set of area experts. Given the authors' experience providing mentorship to others, designing interfaces for children with communication challenges, and studying a variety of speech therapies, they are well-qualified to provide guidance to others developing tools for children with ASD and populations with similar speech and language impairments. As both authors' research agendas include designing for a population characterized by communication impairments, they seek to build professional connections and foster long-term community in this space.

Author Keywords

Autism spectrum disorders; educational gaming; speech recognition; expressive language

ACM Classification Keywords

H.5.2. User Interfaces: Natural language, User-centered design

K.3.1 Computer Uses in Education: Computer-aided instruction, computer-managed instruction

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Figure 1. Select concept art from Hiniker's speech games

Motivation

The authors have a great interest in the 2014 SIGCHI workshop on Supporting Children with Complex Communication Needs. Hiniker is a second-year PhD student who has built her research agenda around designing technologies for children with autism spectrum disorders (ASD), a population characterized by deficiencies in receptive and expressive communication. Hiniker is currently developing a suite of games to encourage speech in young children with ASD, which would benefit greatly from direct and indirect feedback from the workshop audience.

Anticipated Contributions from the Authors

The authors bring expertise in designing for young children with systematic patterns of communication impairments. Hiniker's prior work includes the development of a variety of casual games for children with ASD. She has recently developed a speech-recognition engine tailored to the unique speech idiosyncrasies of children on the spectrum. This engine is the foundation for a series of games that teach three communication skills which are common challenges for children with ASD: labeling, context-appropriate questioning, and intentional management of joint attention through speech (see Figure 1).

In addition to sharing early findings from her speech games, Hiniker would bring deep expertise to this workshop in: 1) patterns of communication impairment in this population including dyspraxia, echolalia, and alternative communication strategies, 2) current evidence-based speech and language interventions for ASD including applied behavior analysis, milieu therapy, and pivotal response therapy, 3) interaction design for extreme users, and 4) current augmentative

and alternative communication tools. As a seasoned software developer who has spent the last three years building experiences for this population, she is well-qualified to provide thoughtful critiques of interfaces for children with ASD and other communication challenges. Hiniker has also designed an assessment portal for parents and therapists of children with ASD which shows the evolution of children's speech, supports time-lapse playback of children's sound production, and tracks the type of prompting necessary to induce children to speak (see Figure 2). She is excited to exchange ideas related to using technology to assess expressive language at this workshop.

Kientz serves as Hiniker's advisor and has supervised all aspects of this work. She brings her own extensive history of designing for children with autism and recently co-authored a book on the topic. With a lab of eight doctoral students and numerous master's and undergraduate students, Kientz brings years of experience in guiding the research efforts of others, in addition to her subject-matter expertise on user-centered design, designing for children, and assistive technology. She would be an invaluable source of feedback for workshop participants.

Workshop Opportunities for the Authors

The authors expect to benefit greatly from the experience of attending this workshop. Hiniker's current project requires input from area-experts representing many diverse fields including speech and language pathology, clinical psychology, computer science, interaction design, and special education. Connecting with potential collaborators who can offer relevant expertise in communication disorders from a variety of disciplinary perspectives would be of great value. She

would benefit from exposure to researchers with experience in natural language processing and evaluation techniques.

Both authors are excited to connect with and receive feedback from others tackling the challenge of helping children with speech and language impairments learn to communicate effectively. They see great opportunity for connections made at this workshop to be lasting ones, and they hope to participate in establishing an enduring community around this topic.

with autism. She holds a bachelor's degree in computer science from Harvard University and a master's degree in educational technology from Stanford University. She has six years of industry experience as a former engineering manager at Microsoft. She is a co-founder of *Go Go Games Studios*, an award-winning game design studio that creates video games for children with autism built on proven therapies. She studies cognition in autism as a visiting researcher at the Stanford Cognitive and Systems Neuroscience Lab and is a Google Anita Borg scholar at the University of Washington.

Julie Kientz

Kientz is an Assistant Professor in Human Centered Design & Engineering at the University of Washington and director of the Computing for Healthy Living and Learning Lab. She has designed, developed, and evaluated mobile, sensor, and social applications for addressing sleep disorders, tracking developmental progress, assisting individuals with visual impairments, helping people quit smoking, and assisting special education teachers working with children with autism. She received her Ph.D. in Computer Science from the Georgia Institute of Technology in 2008. She was awarded a National Science Foundation CAREER Award in 2009, named her department's Junior Faculty Innovator in 2012, and named an MIT Technology Review Innovator Under 35 in 2013.

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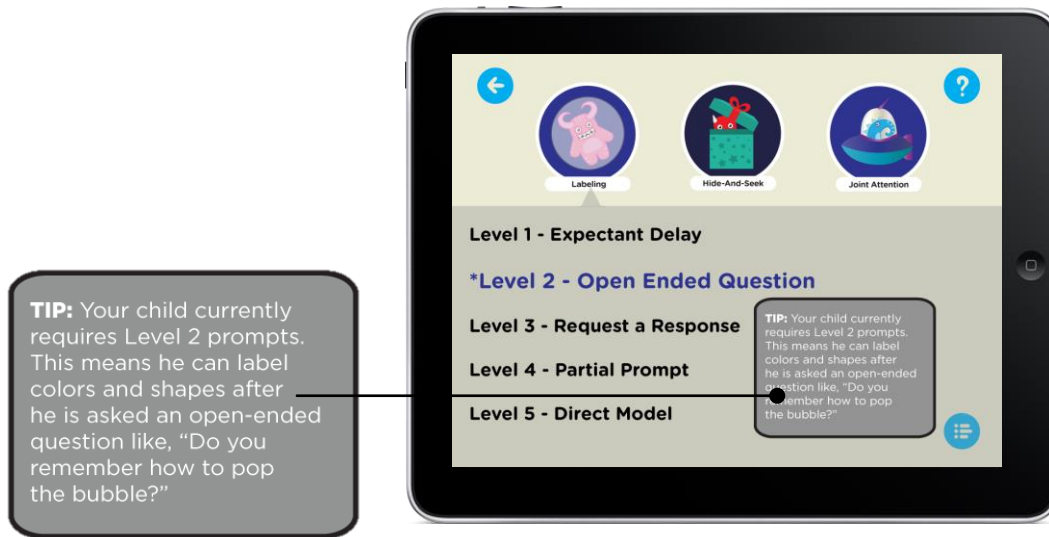


Figure 2. Screenshot from an assessment portal which tracks speech prompting

Biographies

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Hiniker is a PhD student in Human Centered Design and Engineering studying educational gaming for children