The Impact of Wireless Technologies on the Social and Vocational Outcomes of Individuals with Intellectual and Developmental Disabilities

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In the last decade, wireless technology has become an integral part of our daily lives. Despite the pervasive use of technology in today's society, evidence suggests that, in general, people with intellectual and developmental disabilities (IDD) have limited access to technology and that technology is underutilized by this population for a variety of reasons including cost-related challenges and issues with devices being cognitively accessible. The lack of accessibility of some technologies for people with disabilities is concerning as this population stands to benefit the most from new technologies as they can serve as important tools for gaining greater independence and social integration. Improved independence and connectedness can ultimately lead to an improved sense of well-being and quality of life.

While it is evident mobile, wireless, and wearable technologies are becoming more widely used and the dependence upon such technologies is increasing, it is evident `people with all types of disabilities have the lowest rates of usage (Kaye, 2000). Numerous barriers are associated with their non-participation, including (a) lack of basic computer and Internet skills (Moisey & van de Keere, 2007); (b) financial barriers, as many people with IDD cannot afford the cost of devices and their associated services (Moisey & van de Keere, 2007); and (c) limited cognitive accessibility, which is exacerbated by the decreasing size of the interface and the increasing number of features which can be confusing and overwhelming for individuals with IDD (Stock, Davies, Wehmeyer, & Palmer, 2008).

Technology Use in Social Settings by Individuals with IDD

For individuals with IDD, access to cellphones and other mobile technologies means more than being able to text message friends conveniently or pass time playing video games; it is a matter of security and safety and, potentially, greater independence vs. increased isolation (Stock, Davies, Wehmeyer, & Palmer, 2008). Interacting with others increases learning and

helps individuals with IDD build relationships, thereby improving their quality of life (Carter et al., 2010). Efforts to increase social skills and support social connectedness for individuals with IDD also may lead to improved educational and employment outcomes for individuals with IDD (Test, Fowler, White, Richter, & Walker, 2009).

Clement and Bigby (2009) noted that ‘‘typically, people with intellectual disability have small, highly restricted social networks characterized by interactions with other people with intellectual [disability], family members, and paid workers’’ (p. 264). This limited social network ultimately results in the individual having more difficulty building social capital (Davies et al., 2015). In turn, lack of social capital results in less access to the economic, educational, and vocational advantages as well as emotional and physical support that this population may benefit from. The inability to generate social capital has long term impacts for individuals with IDD including reduced access to educational opportunities, reduced access to employment opportunities, and feelings of isolation (Davies et al.).

Researchers have found that social media apps like Facebook can impact social capital by facilitating direct communication through the posting of comments and messaging, typically with individuals the users also know offline, and through browsing profiles and liking photos and posts (Wilson, Gosling, & Graham, 2012). Use of social networking sites, such as Facebook, is rapidly expanding, but people with IDD are at risk for exclusion because sites like Facebook are not designed for cognitive access (Davies et al., 2015).

Technology Use in Vocational Settings by Individuals with IDD

The rate of integrated employment of people with IDD is low and has continued to remain unchanged for the past ten years (Butterworth et al., 2014). According to the National Longitudinal Transition Study (NLTS-2), approximately only half (52%-54%) of young adults with disabilities are employed after exiting school. However, there is a trend towards removing systemic barriers to

employment in the community and increasing effective job support for people in individual jobs (Association of People Supporting Employment First, 2017). In fact, policies are being implemented nationwide to improve the employment prospects and outcomes of people with IDD, a population known to have one of the highest rates of unemployment (Rusch & Dattilo, 2012). Despite progress being made, there are still major barriers in the planning and provision of employment services and supports for people with IDD (Butterworth et al., 2016). Hence, even though many young adults with IDD want to enter the workforce and maintain gainful employment, they frequently require extra assistance that employers are unable to provide at this time.

Access to technology to support people with IDD in the workplace is vital. Notably, hand-held prompting systems have shown to be effective in aiding students with IDD transition through vocational tasks (Cihak, Kessler, & Alberto, 2007; Cihak et al., 2008). Assistive technology for people with IDD can range from personal handheld devices to communication supportive devices to wheelchair physical support. Green, Hughes, and Ryan (2011), indicated that use of a vibrating watch was an effective piece of technology in the workplace setting for improving time management skills. In addition to held-held devices and vibrating watches, other devices such as iPhones (Randall et al., 2020), audio-visual technologies (Cavkaytar, 2017), computer-based interactive games with Augmented Reality (Chang et al., 2014), and iPods as video prompting devices (Van Laarhoven et al., 2009) have also been effective in supporting individuals with IDD in the workplace.

Method

A series of focus groups were conducted to determine what technologies individuals with IDD were using to navigate social and vocational settings and how they were using these technologies to improve their access to meaningful social and vocational experiences.

Participants

To increase the study's rigor, focus groups involved participants with IDD, professionals, and parents, allowing the research team to triangulate multiple data sources (Lincoln & Guba,

1985). Individuals invited to participate in the study included youth and adults with IDD, parents of individuals with IDD, and professionals who work with individuals with IDD (e.g., rehabilitation counselors). Individuals were excluded from the study if they (a) were 20 years of age or younger and (b) did not identify as a stakeholder in one of the following categories: rehabilitation counselors, K-12 educators involved in career transition, certified job coaches, individuals with intellectual and developmental disabilities and/or their families, or employers.

Procedures

Each focus group began with a participant priming session during which the participants were provided specific examples of wireless technologies such as a smartphone, a tablet, or a FitBit. The interviewer also reviewed definitions of the terms, *wireless technology, wearable technology*, and *wearables* and asked if participants had questions or required clarification about these terms. After defining the terminology, videos were presented showing various forms of wireless technologies and wearables. Following the video presentation, the researcher conducted the semi-structured focus group interviews using the established interview guide.

Focus group recordings were transcribed verbatim and then coded in two phases. First, two independent coders, including a faculty member and a member of the research staff, first engaged in an inductive open coding process to generate initial codes, group initial codes into categories, and generate themes. Each coder was provided focus group transcripts and the semi-structured guide to inform their initial coding. Initial coding followed three distinct and iterative stages characterizing a highly modified constant comparative approach (Glaser & Strauss, 1967). Next, once the codebook was established, data were independently deductively coded.

Following the completion of coding and analysis, a final round of coding review and data interpretation was conducted by a faculty member with extensive training in qualitative methods. The purpose of this final round of interpretation was to enhance the study's credibility by using multiple coders with various levels of training and diverse disciplinary perspectives (Maher, Hadfield, Hutchings, & de Eyto, 2018).

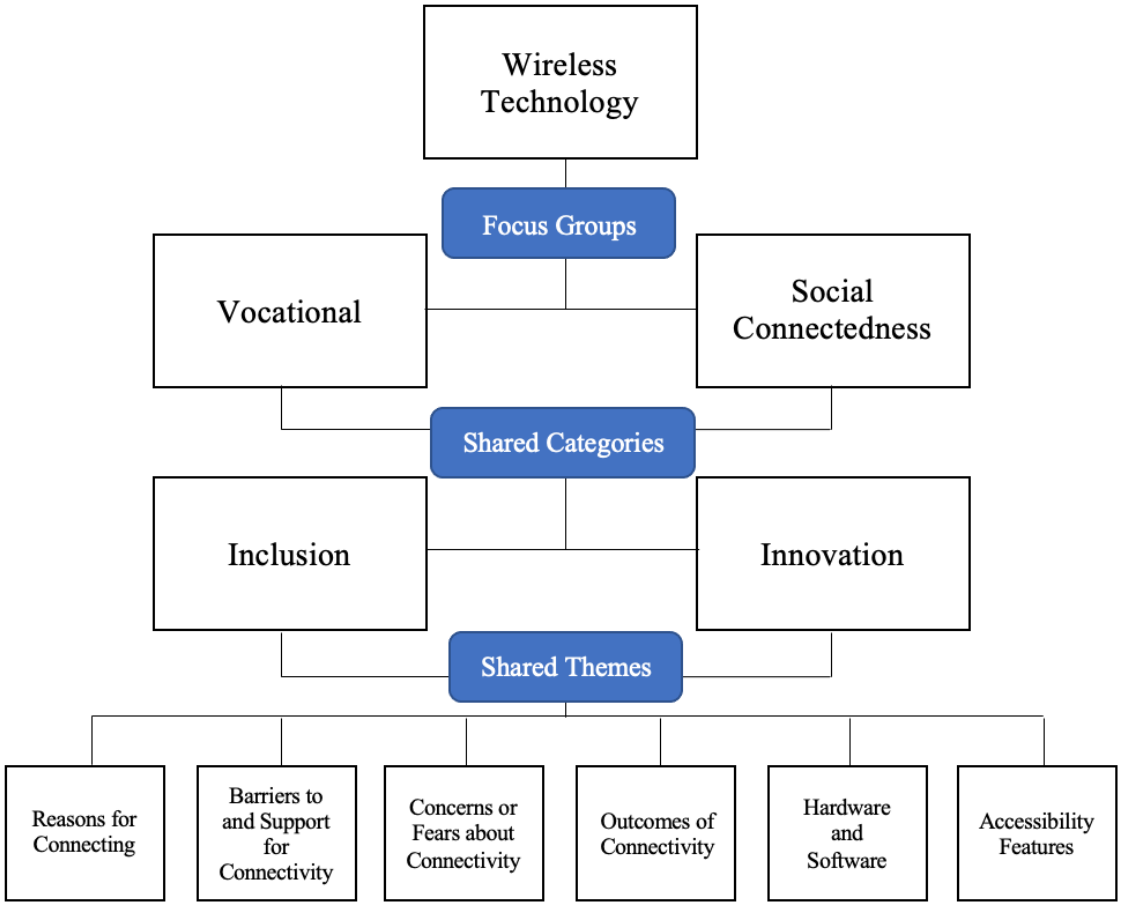
Results

Six major themes emerged from the data across both sets of focus groups, including Reasons for Connecting, Barriers to and Supports for Connectivity, Concerns or Fears about Connectivity, Outcomes of Connectivity, Hardware and Software, and Accessibility Features (see figure 1). These themes are situated within two broader categories: Inclusion and Innovation.

According to the CDC, inclusion of people with disabilities into everyday activities involves practices and policies designed to identify and remove barriers such as physical, communication, and attitudinal, that hamper individuals' ability to have full participation in society, the same as people without disabilities. Innovation, or the process of "creating value by applying novel solutions to meaningful problems" (Digintent, 2020), can be used to support inclusion for individuals with disabilities, however, these efforts should be shaped by a clear understanding of the experiences (i.e., successes and challenges) of technology users with IDD.

Figure 1

Flowchart for Wireless Technology Focus Group



Inclusion

Focus group participants provided many reasons for why they connect socially and vocationally, which commonly included the following: *keeping up with family and friends, fitness/competition, safety,* and *networking*. Across the focus groups, several categories were identified as areas where barriers existed and supports were needed when using wireless devices:

compatibility, knowledge and training, software, and *financial*. Many participants with IDD expressed frustration with not knowing how to use technology and software issues that occur when using technology. Software issues, such as applications not updating, lack of or disruptions in Bluetooth and WiFi connectivity, and having limited data, was another frequently mentioned barrier. Supports for knowledge and training and software issues were also described; one parent mentioned seeking and receiving professional support for troubleshooting. Finances were identified often as a difficulty people with IDD face in connecting socially using wireless technology. Technologies, especially wireless, are expensive and often present as the first barrier an individual will experience in trying to connect via technology. Five subthemes related to fears and concerns about connectivity were identified through the participants' responses, including *device breaking, inappropriate interactions,* and *safety and privacy*. Five subthemes emerged from participants' discussions about the outcomes resulting from the use of wireless technologies for social connectivity: *independence, friendships and support networks,* and *missing out on real, human connection.*

Innovation

Participants described using various kinds of devices frequently to enhance their social connectedness, including hardware such as phones, laptops, and Bluetooth headphones, as well as software and applications such as text messaging, Skype, email, games, and more. Somewhat surprisingly, differences were not divided clearly across the different groups of participants; individuals, parents, and professionals mentioned accessing the same devices and applications, with an emphasis on social media platforms like Facebook, Instagram, and Snapchat. Participants expressed that digital assistants (i.e., Siri, Alexa, Google Assistant) were beneficial in accessing technology to assist in connecting for social and vocational purposes. Professionals

and individuals with IDD agreed that the speech to text function on phones is one of the best supports in participating socially online.

Discussion

Transformation: Implications for Research and Practice

As the digital technology landscape continues to expand, it will be important to explore if and how students with IDD at primary, secondary, and post-secondary education levels are exposed to digital literacy training (Alsalem, 2016) in order to help them to overcome barriers to access, to quell parents' and professionals' concerns and fears about students with IDD connecting online, and to maximize their outcomes. Digital literacy encompasses all the ways individuals use information communication technologies to evaluate and communicate information; it extends beyond the ability to use software or operate digital devices to include a range of cognitive, social, and emotional skills needed to effectively consume and produce information (Eshet, 2004). Furthermore, research should be conducted on the similarities and differences on digital use and exposure between individuals with IDD and typically developing peers. By doing so, researchers could examine the root causes (e.g., observational learning, group-maintained behavior) of engaging in risky digital behavior (e.g., sharing too much personal information) in order to tailor digital literacy training to decrease online risk.

As inclusive postsecondary education (IPSE) programs for students with IDD flourish at college and universities across the country, researchers, advocates, and educators might consider standardizing a digital literacy curriculum to ensure students have the training and support to access all wireless tools and platforms they need to be successful in their education, employment, and social life (Lombardi et al., 2017). One promising program, E-mentoring, has been shown to be an effective method for mentoring individuals with IDD by promoting a peer support system

to include peers and near-peers (Burgstahler & Crawford; 2007). This method focuses on utilizing individuals with disabilities of the same age to share their personal experiences and approaches to digital literacy in order to prevent their peers from making similar mistakes online. Additionally, near peers are individuals who are close in age but are able to make connections different from adult mentors. As individuals move through the program, they themselves can become mentors while gaining valuable connections along with leadership skills.

When people with disabilities become electronically connected, their sense of well-being and quality of life may improve in many ways (Moisey & van de Keere, 2007). For this reason, it is important that the field of special education attend to the voices of individuals with IDD, their parents and other stakeholders as represented in the present study and related research. The findings of the present study were generally consistent with previous research in this area and therefore support the following recommendations for practicing educators, transition specialists, parents, and other stakeholders: (1) teach technology skills while children with disabilities are in school; (2) encourage and support technology developers in making accessibility features and modifications rather than specialized devices; (3) advocate for web accessibility (e.g., screen readers and assistive software) across devices and operating systems; and (4) actively promote online inclusion.

Next Steps

The findings of the present study were generally consistent with previous research in this area and therefore support the following recommendations for practicing educators, transition specialists, parents, and other stakeholders: (1) teach technology skills while children with disabilities are in school; (2) encourage and support technology developers in making accessibility features and modifications rather than specialized devices; (3) advocate for web

accessibility (e.g., screen readers and assistive software) across devices and operating systems; (4) actively promote online inclusion and (5) provide explicit instruction on the value of social capital and methods for generating social capital for individuals with IDD.

Future research should consider exploring which types of wireless devices are most intuitive for people with IDD to use and most financially accessible. It may also be fruitful to explore if and how students with IDD at primary, secondary, and post-secondary education levels are exposed to digital literacy training (Alsalem, 2016) in order to help them to overcome barriers to access, to quell parents' and professionals' concerns and fears about students with IDD connecting online, and to maximize their outcomes. Additionally, while some of the available research on technology and social connectedness for this population of users does include individuals with IDD as participants or informants, it is important that this trend continue.

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