Technology and Social Inclusion: Technology Training and Usage by Youth with IDD in the *National Longitudinal Transition Study of 2012*

Kim W. Fisher, Ph.D.

kwolow1@illinois.edu

University of Illinois at Urbana-Champaign

Heather Williamson, DrPH, MBS, OTR/L, CPH

Northern Arizona University

Nichole Guerra, MS, DBA

The Resource Exchange

Abstract

Technology use is a key form of social inclusion and a means to engage in community participation. Individuals with intellectual and developmental disabilities (IDD) experience a digital divide with less technology access as compared to their peers. We used data from the *National Longitudinal Transition Study of 2012* to study technology use and access to instruction among adolescents with IDD compared to adolescents with other disabilities and adolescents without disabilities. Results indicate adolescents with IDD use technology less, receive less technology training, and engage in fewer social inclusion opportunities than their peers. Implications for future research, policy and practice are provided, including promoting digital citizenship training during transition planning and the use of social capital theory.

Keywords: intellectual and developmental disabilities, technology, social media, social capital

Technology and Social Inclusion: Technology Training and Usage by Youth with IDD in the *National Longitudinal Transition Study of 2012*

Recent research indicates 98% of teens use the internet, 95% have access to a smartphone, and 45% are constantly on technology (Anderson & Jiang, 2018). Technology use is a key form of youth social inclusion and a means to engage in community participation because it builds social networks and social capital (Chadwick & Wesson, 2016; Rainie & Wellman, 2014). Schools recognize this and promote digital learning and participation through College and Career Ready K-12 standards, the International Society for Technology in Education (ISTE) student standards, and in digital citizenship curricula that prepare youth for digital community participation.

However, youth with intellectual and developmental disabilities (IDD) have limited digital skills and access to technology (Chadwick, Wesson, & Fullwood, 2013; Hoppestad, 2013; President's Committee for People with Intellectual Disabilities (PCPID), 2015; Williamson, Fisher, Madhvani, & Talorica, 2019). Further, less is known regarding their access to digital citizenship training, which holds promise to enhance technology use and greater participation and inclusion in society (Hatlevik & Christophersen, 2013; Ng, 2012). Understanding the role technology access, instruction, and use has in the social inclusion of youth with IDD is important for schools to consider, particularly as youth plan for transition to adulthood.

Technology in Our Lives

The majority of Americans use technology to access the *internet of things*, especially digital tools like mobile and cloud-based technology (Lenhart, 2015; Pew Research Center, 2016; Rainie & Anderson, 2017). Digital tools increasingly are key to engaging in daily community living, finding and obtaining employment, developing social networks, scheduling

work and home tasks, health management, safety and security, and managing finances (Anderson & Perrin, 2017). In fact, recent Pew Research Center research indicates 88% of adults (ages 18-29) use some form of social media (Smith & Anderson, 2018). Further, technology access levels for adults have reached near saturation with over 90% of adults using a cellphone or smart phone and the internet (Hitlin, 2018). Youths also experience high levels of technology access and utilize it to create connections with other people (Pew Research Center, 2018).

Social media platforms, in particular, facilitate increased and meaningful connections between individuals and their friends, family, peers, and others. Accessing social media creates access to wider knowledge sources and social opportunities. Such access has been shown to lead to more socially tolerant attitudes and openness to new ideas (Boase and Wellman, 2006). Technology also facilitates collective action on key issues of national importance (Boulianne, 2015). For instance, “texting, tweeting, Facebook, Instagram, and other tools have come into play not only for basic communication, but also to organize community rallies, group events, and even political actions” (National Research Council, 2014, p. 36).

Even though technology use and social media are integral to daily activities, particularly in regards to social inclusion and building social capital (Rainie & Wellman, 2014), individuals with IDD do not access technology at the same rate as their peers (PCPID, 2015) and have lower internet access compared to individuals without disabilities (Chadwick, Wesson, & Fullwood, 2013). In fact, people with IDD are three times more likely to indicate they never use the internet and are less likely to own technology or have access to broadband compared to people without disabilities (Anderson & Perrin, 2017). They also experience isolation in civic participation campaigns around disability issues such as the Americans with Disabilities Act (Williamson, Fisher, Madhvani, & Talorica, 2019), a topic that directly affects them. This is concerning, as

people with IDD already experience higher rates of social isolation and loneliness, and they have small social networks (Fisher & Shogren, 2016; van Asselt-Goverts, Embregts, & Hendriks, 2013; van Asselt-Goverts, et al., 2015).

When individuals with IDD do access technology, they have reported positive experiences using social media to improve their ability to obtain and maintain relationships, improve their social identity (e.g., voicing opinions), and engage in leisure activities that are pleasing (Caton & Chapman, 2016). Technology access and use plays an important role in promoting social inclusion and community participation. However, youth with IDD continue to be isolated and excluded from technology use and digital spaces (Stock, Davies, & Gillespie, 2013).

Barriers to Technology. Barriers to technology use include lack of knowledge and skills of youth with IDD, lack of access and training in schools and with families, concerns about safety, lack of knowledge and skills of families and support professionals, and lack of connection between the role digital participation has in building social inclusion and social networks (Molin, Sorbring, & Löfgren-Mårtenson, 2017; Tanis, et al., 2012). While, the Reading, Writing, Speaking, and Listening College and Career Ready Standards and the student standards of ISTE encourage schools to prepare all students to use technology to connect with others and participate in their societies (CCSSO, 2010; ISTE, 2016), the digital divide continues. Given this divide and the extensive use of technology by youth without disabilities, understanding youth's technology and social media use can reveal the extent to which youth with IDD access the same social spaces as their peers and provide support for research, practice, and policy that addresses their social inclusion in digital spaces.

Utilizing data from the *National Longitudinal Transition Study of 2012,* our purpose was to explore technology instruction and use among youth with IDD, as compared to their peers with

differing disabilities and those without disability, and the role this plays in youth social inclusion opportunities. Our research questions were:

1. What are the differences in technology instruction, technology use, and social inclusion between youth with IDD, youth with other disabilities, and youth without disabilities?
2. What is the relation between disability status and access to social media instruction, perceived usefulness of instruction, and social inclusion opportunities?
3. What is the relation between social inclusion opportunities and access to technology instruction, technology use, and disability status?

Methods

We utilized a quasi-experimental correlation design in which secondary data analysis of the *National Longitudinal Transition Study of 2012* (*NLTS2012*) was completed. Our study was reviewed and approved by the lead author's Institutional Review Board.

Data Sample

The *NLTS2012* is a longitudinal national study conducted by the Institute for Education Sciences (IES; Blumenthal et al., 2017). The *NLTS2012* has a representative sample of approximately 13,000 U.S. youth aged 13-22 years old with and without disability and their parents or guardians. Both parent and youth data were collected in 2012 and 2013. We selected this dataset as it was the first wave of NLTS that specifically asked about social media instruction and social media use.

Our sample (N = 10,140) was comprised of youth who were labeled as enrolled during the 2012 or 2013 school year. This sample was created by keeping the cases of youth whose parents responded to the parent survey, were enrolled in school, and were not older than 22 as of August 15 in the year the survey was completed (c_p_enrolledyouth = 1). Eighty-one percent of the

sample included students identified as having a disability under the Individuals with Disabilities Education Act (IDEA). The disability status of those in the sample were defined using the 13 disability categories in IDEA and reported in the youth's Individualized Education Program (IEP). Students without an IDEA defined disability comprised 19% of the sample (students without disability). It is important to note that about 5% of this population included students who had 504 plans. IEP plans require specialized instruction, whereas 504 plans outline needed modifications or accommodations, but not specialized instruction.

Participants completed the youth questionnaire in all but 16% of cases in the full sample. In these cases, parents completed the youth questionnaire as a proxy because the youth could not respond to the questionnaire despite accommodations. Overall, 19% of participants with IEPs and 4% of participants without IEPs had parents respond by proxy to the youth questionnaire. Proxy responses for youth with IDD were as follows: (a) 33% autism, (b) 34% intellectual disability, and (c) 48% multiple disability. See Table 1 for descriptive statistics.

Predictor and Outcome Variables

The predictor variable was youth disability status. Outcome variables included receiving social media instruction, usefulness of instruction, frequency of communicating with friends through social media and texting, and frequency of seeing friends. Table 2 indicates variables used, variable descriptions, and coding.

Predictor variables. We created a variable in order to develop three categories of youth by disability status. The three categories were youth with IDD, youth with other IDEA disabilities, and youth without disability. To do this, variable *d_y_disability* was used which provided the IDEA disability category for all participants. Youth with IDD were those whose disability was autism, intellectual disability, or multiple disability. Youth with any of the other IDEA disability

categories were grouped together (e.g., Specific Learning Disability, Other Heath Impaired). Finally, youth without disability included youth without disability and youth who may receive services under a 504 plan.

Outcome variables. Receiving social media instruction did not need to be recoded as youth indicated yes or no and the assigned numerical value for each category was appropriate (i.e. no=0, yes=1). Usefulness of technology instruction was reverse coded with the following categories: (a) very useful, (b) somewhat useful, and (c) not useful. The variables for social media use, texting, and seeing friends were reverse coded and categories were collapsed to create binary outcome variables. For communicating through social media with friends or texting, youth indicated their frequency on a 5-point Likert scale with 1 indicating several times a day and 5 indicating never. These variables were reverse coded and collapsed to create binary outcome variables: (a) often (several times a day, once a day, and several times a week) and (b) rarely or never (once per week or less, never). Youth indicated the frequency they saw their friends on a 6-point Likert scale. This variable was reverse coded and collapsed to create a binary outcome variable with the categories (a) often (6 or 7 days a week, 4 or 5 days a week, 2 or 3 days a week, 1 day a week) and (b) rarely or never (sometimes, but not every week; never).

Analysis Procedures

All tests were run in Stata 16 which allowed for analyses of complex survey design data. IES used a stratified sampling stratum based on district size and IDEA disability status. Because of the unique sampling and stratum design, all analyses must use the "analytic weight, the analysis stratum, and analysis primary sampling unit to obtain correct weighted means and standard errors" (Bloomenthal et al., 2017, p. 23). Therefore, all data were run in Stata 16 using the svyset c_apsu [pweight = <y_weight_enrolledyouth>], strata(c_astratum) command. All

further analyses used the *svy:* command which allows for any analysis following this command to be analyzed based on the complex design.

Descriptive statistics. First, frequencies were run on all predictor and outcome variables to assess missing. All missing were due to Skip Logic where youth were not respondents to the question based on answers to previous questions. All outcome variables were asked of youth who completed the youth questionnaire or of parents who completed the youth questionnaire by proxy. Questionnaires for youth whose parents responded by proxy eliminated any question that involved youth opinions. Youth who did not respond to the questionnaire or whose parents/guardians did not respond through proxy include youth who were incarcerated, deceased, or whose support needs were such that the parent respondent did not have the student complete the youth questionnaire (this included students with intensive support needs).

Models. Chi-square tests by disability group were run to explore differences in outcome variables. To explore the relation between the predictor and outcome variables, logistic regression models were run. All analyses by disability status (i.e., chi-square, logistic regression) were run using the svy: command to account for the complex survey design.

Results

Our results indicate youth with IDD continue to be socially excluded from the technology world (instruction access and technology use) as compared to their peers with other disabilities and without disabilities. Generally, youth with IDD have less access to social media instruction than peers with other disabilities or without disabilities. They were also more likely than either peer comparison group to use social media and texting to communicate with friends rarely or never. Further, youth with IDD were significantly less likely to see their friends at least once per

week. However, using social media improved the likelihood they would see their friends. See Table 3 for outcome variable frequencies and chi-square tests.

Research Question 1: Technology Instruction, Technology Use and Social Inclusion

Fifty-one percent of youth indicated they received instruction on social networking sites. Just over 50% of youth reported the social media instruction they received was very useful. Seventy percent of youth report communicating with friends through social media. A majority of youth (70%) report texting with friends often. Finally, a majority of youth, 65%, indicate often seeing their friends. See Table 3 for a summary of results by disability status. Chi-square tests revealed statistically significant differences by disability status for receiving social media instruction, technology use, and social inclusion opportunities (communicating via social media or texting). Overall, youth with IDD were significantly less likely to receive social media instruction, more likely to find social media instruction useful, less likely to communicate with friends through social media or technology, and less likely to see their friends.

Research Questions 2: Technology and Social Opportunities Relationship to Disability

Received social media instruction. Further analysis indicates a significant effect by disability with youth without disability and youth with other IDEA disability being 26% more likely to receive social media instruction (OR = 1.26, CI = 1.11 – 1.43, $p < 0.0001$). Analysis by disability type (main effect by disability type) indicate youth with other IDEA disabilities were 27% more likely to receive social media instruction than youth with IDD (OR = 1.27, CI = 1.06 – 1.51, $p < 0.01$). Youth without disability were 59% more likely to receive social media instruction (OR = 1.59, CI = 1.29 – 1.96, $p < 0.0001$).

Usefulness of social media instruction. Further analysis indicates youth with other IDEA disabilities or youth without disability were 23% less likely to indicate social media instruction

was very useful as compared to youth with IDD (OR = 0.77, CI = 0.63 – 0.93, $p < 0.01$). Specifically, youth with other IDEA disabilities were 31% less likely than youth with IDD to indicate the instruction was very useful (OR = 0.69, CI = 0.52 – 0.90, $p < 0.01$). Youth without disability were 46% less likely than youth with IDD to indicate social media instruction was very useful (OR = 0.54, CI = 0.40 – 0.73, $p < 0.0001$).

Using social media to communicate with friends. Receiving instruction was not related to using social media with friends (OR = 1.22, CI = 0.95 – 1.58, $p < 0.10$), but, disability type was (OR = 1.71, CI = 1.48 – 1.98, $p < 0.0001$). Specifically, those with other IDEA disabilities were 274% more likely than those with IDD to indicate communicating with friends via social media (OR 2.74, CI = 2.32 – 3.24 $p < 0.0001$). Youth without disability were 410% more likely than youth with IDD to indicate they communicate with friends via social media (OR = 4.10, CI = 3.28 – 5.12, $p < 0.0001$). While instruction alone did not improve social media use with friends, there was an interaction effect between receiving instruction and disability status and social media use with friends. Specifically, students with IDD who received instruction on social media were 49% more likely to interact with friends via social media (OR = 1.49, CI = 1.00 – 2.23, $p < 0.05$). The interaction between receiving instruction and disability status on using social media to communicate was not significant. Likewise, the interaction with usefulness of instruction and disability status did not have a significant effect.

Texting with friends. Youth without IDD were 248% more likely than youth with IDD to text with friends (OR = 2.48, CI – 0.00 – 2.08, $p < 0.0001$). When looking by disability type, youth with other IDEA disabilities were 332% more likely (OR = 3.32, CI = 2.74 – 4.03, $p < 0.0001$) and youth without disability were 744% more likely (OR = 7.44, CI = 5.75 – 9.63, $p <$

0.0001) to text friends. Overall, receiving social media instruction or usefulness of instruction did not have a statistically significant effect on frequency of texting.

Research Question 3: Technology Instruction/Use, Disability Status, and Social Inclusion

When examining the role of technology instruction, technology use, and disability has on youth's social inclusion opportunities, we found that receiving social media instruction or usefulness of social media instruction did not significantly affect the youth's likelihood they saw friends at least once per week. While instruction and usefulness of instruction were not significant, communicating with friends by using social media was. In particular, youth with other IDEA disabilities were 149% more likely to see their friends at least once per week (OR = 1.49, CI = 1.28 – 1.74, $p < 0.0001$. Youth without disability were 213% more likely to see their friends at least once per week (OR = 2.13, CI = 1.74 – 2.61, $p < 0.0001$). Those who use social media to communicate with friends were 202% more likely to see their friends at least once per week than youth who do not (OR = 2.02, CI = 1.56 – 2.63, $p < 0.0001$).

Discussion

We set out to understand access to technology instruction and technology use for youth with IDD and to what extent technology supports youth with IDD in engaging in social inclusion opportunities. Our findings indicate youth with IDD continue to be socially excluded from the technology world (instruction access and tech use) as compared to their peers. Further, this exclusion has substantial ramifications on youth with IDD not participating in key social inclusion opportunities with their friends.

Youth with IDD, for whom this study further confirmed, experience a digital divide. To address this digital divide, they will need technology use knowledge and skills to be integrated into instruction and support. For example, the National Council on Disability (2011) noted that

finding, attaining, and maintaining employment requires significant expansion of individuals' with IDD knowledge, skills, and access to the digital world through education, training, and awareness campaigns for people with disabilities. In their most recent report to the President, the PCPID (2015) made several recommendations about embedding knowledge development, skill acquisition, and access to technology as a basic right of all individuals with IDD.

Further, in the IDD field, the integration and use of technology across life activities is now an emerging field of research (Stock, Davies, & Gillespie 2013). Given the integral nature of technology in a youth's life (Perrin & Andersen, 2017), exploring access to technology instruction and use and how this promotes or prevents social inclusion opportunities for youth with IDD is important. In fact, investigating and promoting technology instruction and use for full participation is supported in national goals and in the joint position statement on education by the American Association on Intellectual and Developmental Disabilities and The Arc (AAIDD, 2018; Thoma, Cain, & Walther-Thomas, 2015). Our study further reflects the importance of growing technology access as a priority for youth with IDD. We discuss implications for this work in research, practice, and policy.

Implications for Research

Our study confirmed that youth with IDD are often unprepared for real-world technology use as they enter adulthood, where technology is critical for social connections, employment, and community participation (Wehmeyer, Tassé, Davies, & Stock, 2012), leaving the adult service system to fill this gap (Stock Davies, & Gillespie, 2013). Individuals with more intensive support needs are at greater risk for technology isolation, which research with only family members and staff indicates lack of training, safety concerns, and inaccessibility as potential barriers experienced by self-advocates (Braddock et al., 2013). However, evidence indicates that

individuals with IDD who access technology for social participation use social media to improve their relationships and social identity, and engage in leisure activities (Caton & Chapman, 2016). Exploring technology-use and its influence on expanded social networks can illuminate social inclusion and community participation. However, future research should focus on how access differs for youth living in poverty or in rural communities who may not have access to technology and cellular service plans that allow for access to the internet while not on wi-fi, whose access to the internet is primarily through smartphone, or who live in areas with limited bandwidth (Anderson, 2018; Anderson & Kumar, 2019; Marler, 2019).

Research on digital knowledge and skills among youth with IDD has been limited including work examining composing and sending emails (e.g., Cihak et al., 2015), using communication apps as a voice-output communication system (e.g., Sigafoos, O'Reilly, Lancioni, & Sutherland, 2014), using technology as a self-monitoring system for employment (e.g., Wehmeyer, et al., 2006), and activities of daily living (e.g., Ayers, Mechling, & Sansoti, 2013). This research reflects a narrow view of the knowledge and skills necessary to fully access and participate in the digital community using information communication technology. It is promising that some researchers have explored youth's with IDD digital skills, addressing the social connection benefits of living a connected life (Gillespie-Lynch et al., 2014; Molin, Sobring, & Löfgren-Mårtenson, 2017; Raghavendra, Newman, Grade, & Wood, 2015). However, additional work on digital citizenship is needed (Seok & DaCosta, 2017).

Further, additional research is needed on how access to technology, and in particular social media use and participation, impacts youth's with IDD opportunities to engage with friends and participate in their communities. This work could use a social capital theoretical framework which recognizes there is value in the relationships we have with others. Social capital theory

posits social capital at the individual level is a form of capital based on one's social network (i.e., social ties) and the individual's position within that network yields benefits such as information, resources, and support (Coleman, 1988). Because individuals utilize technology to maintain social connections with close friends and family and to connect with others outside their immediate networks on issues related to employment and community participation (Rainie & Wellman, 2014), it is important to explore the extent to which youth with IDD access social capital through technology and barriers and facilitators they experience.

Social capital can also occur at the group level, in communities where connections with others promote civic engagement, a series of activities that promote civic life in communities and require both individual actions and interactions with others to improve communities and the quality of life of community members (National Research Council, 2014). Technology plays a key role in this because it allows people to take collective action on key issues of national importance (Gil de Zúñiga, Jung, & Valenzuela, S., 2012). For instance, "texting, tweeting, Facebook, Instagram, and other tools have come into play not only for basic communication, but also to organize community rallies, group events, and even political actions" (National Research Council, 2014, p. 36). Using a social capital lens, researchers could explore how technology use promotes self-advocacy and community participation.

Implications for Practice

Given that digital access is key to community participation and social inclusion (Chadwick & Wesson, 2016) and that it is a right of people with IDD (Braddock et al., 2013), the digital divide between youth with and without IDD increases risk for social isolation and less information access. Technology plays an important role in self-advocacy, community participation, and employment (Hatlevik & Christophersen, 2013; National Council on

Disability, 2012; Ng, 2012; Rainie & Wellman, 2014), two key areas of transition for youth with IDD, so more instruction is needed during their transition into adulthood. In fact, technology experts overall agree that engaging in technology promotes well-being in many ways including increasing connection, access, and commerce (Pew Research Center, 2018). They also recognize harm that can occur including digital deficits (i.e., cognitive abilities to manage tech), digital duress or information overload, and digital dangers such as bullying, threatening, and violence (Jenaro et al., 2018; Maïano et al., 2016). The experts agree that technology is here to stay and whether the harms related to digital life can be mitigated depends on a multi-pronged approach to recreate digital tools and systems, regulate technology and technological experiences, and formulate digital citizenship across all ages and abilities. Unfortunately, individuals with IDD are often overlooked in efforts to promote computer literacy and digital citizenship training programs (Hoppestad, 2013).

Schools have implemented digital citizenship curricula to prepare students to be knowledgeable, skilled, and responsible digital citizens (Ribble, 2012). Digital citizenship training includes knowledge and skills related to: accessing technology; purchasing and selling items online; communicating with friends and family via social network applications, email, or texting; understanding how to use technology for a variety of purposes; engaging in appropriate, safe, and secure digital behavior; understanding one's rights and responsibilities when engaging in digital behavior; and monitoring and researching one's health and wellness via technology. Digital citizenship is a valued skill for college and career readiness as evidenced by emphasis in digital citizenship skills in technology education standards to be responsible and ethical digital citizens (ITSE, 2016). Further, research and policy back the need to address digital citizenship skills for general education, garnering support from Career and Technical Education (e.g.,

Quann, 2015; Stock, Davies, & Gillespie, 2013; Wehmeyer & Shogren, 2013), public institutions such as museums and libraries (Institute of Museum and Library Services, 2012), and the federal government (e.g., Federal Trade Commission, 2014).

While digital citizenship training for youth and young adults is publicly available and even aligned to the College and Career Ready Standards, it is not clear what, if any, access youth with IDD, or their families, teachers, and direct support providers have. Publicly available digital citizenship curricula, through organizations such Common Sense Media, are available for students, families, and schools (Common Sense Media, 2015; Public Library Association, 2017). In addition, Self-Advocates Becoming Empowered created *My Technology Handbook 2: How to Safely Get What you Want Online* (SABE, 2019), a resource for people with IDD which provides baseline knowledge on accessing digital resources. It is not clear whether these resources are being provided or are accessible to young adults with IDD.

The value in accessing digital citizenship training for youth with IDD lies in its potential to influence their full participation in the digital community. More research is needed to understand barriers to understanding the role digital citizenship has in the lives of promoting community participation of youth with IDD, what are the key components of a digital citizenship training package including curricular and instructional needs and supports, and how access to such training could facilitate improved outcomes on social inclusion and increase community participation for this population. Expanded technology use and digital community participation for youth with IDD holds the promise to improve their social inclusion in the form of increased digital participation and expanded social networks.

Implications for Policy

Technology access is critical for community participation and social networks because it facilitates engagement opportunities and builds social capital (Rainie and Wellman, 2014). For instance, social media platforms facilitate connections between individuals and their networks for collective action on key issues of national importance for people with IDD (Boulianne, 2015; National Research Council, 2014). As such, it is a recognized policy goal into adulthood (National Council on Disability, 2011; PCPID, 2015).

Schools can implement policies which would promote utilizing the IEP and transition plans to embed technology instruction and access for youth with IDD and prepare them for participation and full participation (Dean, Fisher, Shogren, & Wehmeyer, 2015). First, IDEA requires that all students have access to the general curriculum and this should include access to social media instruction or digital citizenship training. In fact, IEP goals that are aligned to the English Language Arts standards in the College and Career Ready Standards can be used to address the need for digital citizenship instruction. Additionally, the high school English Language Arts standards, which include reading, writing, speaking, and listening, indicate students who are college and career ready "can use technology and digital media strategically and capably" (CCSS ELA, p. 7) including learning online, evaluating sources, and communicating with others through writing using technology. Therefore, teachers can embed digital citizenship instruction within an IEP goal that is aligned to these grade-level standards.

Further, long-term transition goals can be written to address participating in digital spaces and community to build self-determination and social networks and promote civic participation through the independent living focus of transition planning (Hunt, McDonnell, & Crockett, 2012; Thoma et al., 2015; Van Laarhoven-Myers et al., 2014). Further, technology plays a key role in employment and requires significant expansion of youth's with IDD knowledge, skills, and

access to the digital world through education, training, and awareness campaigns for people with disabilities (National Council on Disability, 2011). Therefore, promoting policies which would embed technology instruction and use into employment transition long-term and short-term goals can be used to leverage access.

Study Limitations and Strengths

Our study has limitations that are important to address. First, we used secondary survey data which limits research designs and research questions to what is available in the dataset. Because this is survey data, we were only able to ascertain what people report they are receiving or doing and not collect observation data on what they are actually doing or qualitative data that would allow them to share their stories about technology training and use (Krosnick, Visser, & Lavrakas, 2000). Further, the data analyses was correlational and as such represent associations between predictor and outcome variables rather than cause and effect, as in experimental research. The *NLTS2012* does not provide any information on the content or format of the technology instruction and so it is difficult to know how comprehensive the instruction was. Future research should examine the effect of receiving social media instruction and technology use and design instruction that is focused on the digital citizenship needs of the individual and family to ensure that it is useful. Finally, the data were collected in 2012 and 2013 and asked youth about their social media use providing examples of social media platforms such as Facebook©, Twitter©, Yahoo groups©, or MySpace©. Recent research indicate youth primarily use YouTube©, Instagram©, and Snap Chat©. These platforms have different purposes and uses; therefore, the experiences may be different and future research will need to address the most current form of social media.

Despite these limitations, our study provides important data on technology instruction and use for a nationally representative sample of youth with IDD which improves the generalizability of findings. Further, because the *NLTS2012* has data on youth without disabilities, we were able to ascertain the discrepancy in access to instruction and use and how this impacts key social inclusion opportunities for youth with IDD. Few research studies have done this at this scale and with a large and diverse sample of youth. Finally, although there has been research on social media use and adults with IDD, little research has explored access for youth with IDD.

Despite day-to-day technology to access resources and to stay connected to community, we confirmed a large digital divide between youth with IDD and youth with other disabilities and youth without disabilities. We also identified a need to evaluate the most effective mechanisms for providing instruction on technology use for which digital citizenship training holds promise. If youth with IDD are truly being prepared for full participation in adulthood through their transition planning and instruction, then technology must be embedded.

References

Anderson, M. (2018, September 10). About a quarter of rural Americans say access to high-speed internet is a major problem. Retrieved from https://pewrsr.ch/2NmOC2V

Anderson, M. & Kumar, M. (2019, May 7). Digital divide persists even as low-income Americans make gains in adoption. Retrieved from https://pewrsr.ch/2vK1HIo

Anderson, M. & Perrin, A. (2017, April 7). Disabled Americans are less likely to use technology. *Fact Tank: News in the Numbers*. Retrieved from http://pewrsr.ch/2og9Q4z

American Association on Intellectual and Developmental Disabilities (AAIDD) and The ARC. (2018). *Joint Position Statement on Education*. Retrieved from https://aaidd.org/news-policy/policy/position-statements/education

Ayres, K., Mechling, L., & Sansosti, F. (2013). The use of mobile technologies to assist with life skills/independence of students with moderate/severe intellectual disability and/or autism spectrum disorders: *Psychology in the Schools*, *50*, 259–271. doi: 10.1002/pits

Bloomenthal, A., Haimson, J., Lipscom S., Liu, A. Y., Potter, F., & Waits, T. (2017). *National Longitudinal Transition Study 2012 restricted-use data file: Sampling and 2012-2013 survey data (NCEE 2017-4020).* Washington, D.C.: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance.

Boase, J. & Wellman, B. (2006). Personal relationships: On and off the internet. In A.L. Vangelisti & D. Perlman (Eds.), *The Cambridge Handbook of Personal Relationships.* New York: Cambridge University Press.

Boulianne, S. (2015). Social media use and participation: a meta-analysis of current research. *Information Communication and Society*, *18*(5), 524–538. doi: 10.1080/1369118X.2015.1008542

Braddock, D., Hoehl, J., Tanis, S., Ablowitz, E., & Haffer, L. (2013). The rights of people with cognitive disabilities to technology and information access. *Inclusion*, *1*, 95–102. doi: 10.1352/2326-6988-01.02.95

Caton, S. & Chapman, M. (2016). The use of social media and people with intellectual disability: A systematic review and thematic analysis. *Journal of Intellectual and Developmental Disability*, *41*, 125-139. doi: 10.3109/13668250.2016.1153052

Cihak, D. F., McMahon, D., Smith, C. C., Wright, R., & Gibbons, M. M. (2015). Teaching individuals with intellectual disability to email across multiple device platforms. *Research in Developmental Disabilities*, *36*, 645–656. doi: 10.1016/j.ridd.2014.10.044

Chadwick, D., Wesson, C., & Fullwood, C. (2013). Internet access by people with intellectual disabilities: Inequalities and opportunities. *Future Internet*, *5*, 376–397. doi: 10.3390/fi5030376.

Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, *94*, S95–S120. doi:10.1080/09687599.2012.741517

Common Sense Education. (2015). *Our k-12 Digital Citizenship Curriculum*. San Francisco, CA: Common Sense Media. Retrieved from https://www.commonsensemedia.org/sites/default/files/uploads/classroom_curriculum/cs_digitalcitizenshipcurric_2016_release.pdf

Council of Chief State School Officers (CCSSO) and National Governors Association Center (NGA). (2010). *Common Core State Standards for English Language Arts*. Washington,

DC: National Governors Association Center for Best Practices, Council of Chief State School Officers.

Dean, E. E., Fisher, K. W., Shogren, K. A., & Wehmeyer, M. L. (2016). Participation and intellectual disability: A review of the literature. *Intellectual and Developmental Disabilities, 54,* 427–439. doi: 10.1352/1934-9556-54.6.427

Federal Trade Commission. (2014). *Living Life Online*. Washington, D.C.: Federal Trade Commission. Retrieved from https://www.consumer.ftc.gov/articles/pdf-0006-living-life-online_0.pdf

Fisher, K. W., & Shogren, K. A. (2016). The influence of academic tracking on adolescent social networks. *Remedial and Special Education, 37,* 89–100. doi: 10.1177/0741932515616758

Gillespie-Lynch, K., Kapp, S. K., Shane-Simpson, C., Smith, D. S., & Hutman, T. (2014). Intersections between the autism spectrum and the internet: Perceived benefits and preferred functions of computer-mediated communication. *Intellectual and Developmental Disabilities, 52,* 456–469. doi: 10.1352/1934-9556-52.6.456

Gil de Zuniga, H., Jung, N., & Valenzuela, S. (2012). Social media use for news and individuals' social capital, civic engagement and political participation. *Journal of Computer-Mediate Communication, 17,* 319-336. doi: 10.1111/j.1083-6101.2012.01574.x

Hatlevik, O. E., & Christophersen, K. A. (2013). Digital competence at the beginning of upper secondary school: Identifying factors explaining digital inclusion. *Computers and Education, 63,* 240–247. doi: 10.1016/j.compedu.2012.11.015

Hitlin, P. (2018, September 28). Internet, social media use and device ownership in U.S. have plateaued after years of growth. Retrieved from https://pewrsr.ch/2Q79jMU

Hoppestad, B. S. (2013). Current perspective regarding adults with intellectual and developmental disabilities accessing computer technology. *Disability & Rehabilitation: Assistive Technology*, *8*, 190–194. doi: 10.3109/17483107.2012.723239

Hunt, P., McDonnell, J., & Crockett, M. (2012). Reconciling an ecological curricular framework focusing on quality of life outcomes with the development and instruction of standards- based academic goals. *Research and Practice in Severe Disabilities*, *37*, 139–152.

Institute of Museum and Library Services. (2012). *Building Digital Communities: A Framework for Action*. Washington, D.C.: Institute of Museum and Library Services. Retrieved from https://www.imls.gov/publications/building-digital-communities-framework-action

International Society on Technology in Education (ISTE). (2016). *ISTE Standards for Students.* Washington, D.C. Retrieved from https://www.iste.org/standards/for-students

Jenaro, C., Flores, N., Vega, V., Cruz, M., Pérez, M. C., & Torres, V. A. (2018). Cyberbullying among adults with intellectual disabilities: Some preliminary data. *Research in Developmental Disabilities*, *72*, 265–274. doi: 10.1016/j.ridd.2017.12.006

Krosnick, J. A., Visser, P. S., & Lavrakas, P. J. (2000). Survey research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 223–252). New York, New York: Cambridge University Press.

Lenhart, A. (2015, August 6). *Teens, Technology, and Friendships* [Report]. Retrieved from https://www.pewinternet.org/2015/08/06/teens-technology-and-friendships/

Maïano, C., Aimé, A., Salvas, M. C., Morin, A. J. S., & Normand, C. L. (2016). Prevalence and correlates of bullying perpetration and victimization among school-aged youth with

intellectual disabilities: A systematic review. *Research in Developmental Disabilities*. doi: 10.1016/j.ridd.2015.11.015

Marler, W. (2019). Mobile phones and inequality: Findings, trends, and future directions. *New Media and Society*, *20*(9), 3498–3520. doi: 10.1177/1461444818765154

Molin, M., Sorbring, E., & Löfgren-Mårtenson, L. (2017). New em@ncipatory landscapes? Young people With intellectual disabilities, internet use, and identification processes. *Advances in Social Work, 18*, 645-662. doi: 10.18060/21428

National Council on Disability. (2011). *The Power of Digital Inclusion: Technology's Impact on Employment and Opportunities for People with Disabilities*. Washington, DC: National Council on Disability.

National Research Council. (2014). *Civic Engagement and Social Cohesion: Measuring Dimensions of Social Capital to Inform Policy*. Washington, DC: The National Academics Press. doi: 10.17226/18831

Ng, W. (2012). Can we teach digital natives digital literacy? *Computers & Education, 59*, 1065–1078. doi:10.1016/j.compedu.2012.04.016

Pew Research Center. (2016). *Shared, Collaborative and On Demand: The New Digital Economy* [Report]. Retrieved from http://www.pewinternet.org/2016/05/19/the-new-digital-economy/

Pew Research Center. (2018). *Teens, Social Media, and Technology* [Report]. Retrieved from https://www.pewinternet.org/2018/05/31/teens-social-media-technology-2018/

Pew Research Center. (2018). *The Future of Well-Being in a Tech-Saturated World* [Report]. Retrieved from https://www.pewinternet.org/2018/04/17/the-future-of-well-being-acknowledgments/

President's Committee for People with Intellectual Disabilities (PCPID). (November, 2015). *Leveling the Playing Field. Improving Technology Access for People with Intellectual Disabilities*. Retrieved from https://acl.gov/sites/default/files/programs/2017-03/PCPID-2015-Report-to-President.pdf

Public Library Association. (2017). *Digital Literacy.* Chicago, IL. Retrieved from: https://www.digitallearn.org/

Quann, S. (2015). I*ntegrating Digital Citizenship and Problem Solving into Instruction.* Washington, D.C.: U.S. Department of Education. Retrieved from: https://lincs.ed.gov/professional-development/resource-collections/profile-820

Raghavendra, P., Newman, L., Grace, E., & Wood, D. (2015). Enhancing social participation in young people with communication disabilities living in rural Australia: Outcomes of a home-based intervention for using social media. *Disability and Rehabilitation*, *37*(17), 1576–1590. doi: 10.3109/09638288.2015.1052578

Rainie, L. & Anderson, J. (2017, June 6). The internet of things connectivity binge: What the implications? Retrieved from http://www.pewinternet.org/2017/06/06/the-internet-of-things-connectivity-binge-whatare-the-implications

Rainie, L. & Wellman, B. (2014). *Networked: The Social Operating System*. Cambridge, MA: The MIT Press.

Ribble, M. (2012). Digital citizenship for educational change. *Kappa Delta Pi Record, 48,* 148–151. doi: 10.1080/00228958.2012734015

Self-Advocates Becoming Empowered. (2019). *My Technology Handbook 2: How to Safely Get What you Want Online.* Retrieved from: https://www.sabeusa.org/wp-content/uploads/2019/05/My-Technology-Handbook-2.pdf

Seok, S. & DaCosta, B. (2017). Digital literacy of youth and young adults with intellectual disability predicted by support needs and social maturity. *Assistive Technology, 29,* 123–130. doi: 10.1080/10400435.2016.1165759

Sigafoos, J., O'Reilly, M. F., Lancioni, G. E., Sutherland, D. (2014). Augmentative and alternative communication for individuals with autism spectrum disorder and intellectual disability. *Current Developmental Disorders Reports, 1,* 51-57. doi: 10.1007/s40474-013-0007-x

Smith, A. & Anderson, M. (2018, March 1). Social media use in 2018. Retrieved from http://www.pewinternet.org/2018/03/01/socialmedia-use-in-2018/

Stock, S. E., Davies, D. K., & Gillespie, T. (2013). The state of the field in applied cognitive technologies. *Inclusion, 1,* 103–120. doi: 10.1352/2326-6988-01.02.103

Tanis, E. S., Palmer, S., Wehmeyer, M., Davies, D. K., Stock, S. E., Lobb, K., & Bishop, B. (2012). Self-report computer-based survey of technology use by people with intellectual and developmental disabilities. *Intellectual and Developmental Disabilities, 50,* 53–68. doi: 10.1352/1934-9556-50.1.53

Thoma, C. A., Cain, I., & Walther-Thomas, C. (2015). National goals for the education of children and youth with intellectual and developmental disabilities: Honoring the past while moving forward. *Inclusion, 3,* 219–226. doi: 10.1352/2326-6988-3.4.219

van Asselt-Goverts, a E., Embregts, P. J. C. M., & Hendriks, a H. C. (2013). Structural and functional characteristics of the social networks of people with mild intellectual disabilities. *Research in Developmental Disabilities, 34*(4), 1280–1288. doi: 10.1016/j.ridd.2013.01.012

Received 7/30/2019, accepted 10/9/2019

van Asselt-Goverts, A. E., Embregts, P. J. C. M., Hendriks, A. H. C., Wegman, K. M., & Teunisse, J. P. (2015). Do social networks differ? Comparison of the social networks of people with intellectual disabilities, people with autism spectrum disorders and other people living in the community. *Journal of Autism and Developmental Disorders*, *45*(5), 1191–1203. doi: 10.1007/s10803-014-2279-3

Van Laarhoven-Myers, T. E., Van Laarhoven, T. R., Smith, T. J., Johnson, H., & Olson, J. (2016). Promoting self-determination and transition planning using technology: Student and parent perspectives. *Career Development and Transition for Exceptional Individuals*, *39*, 99–110. doi: 10.1177/2165143414552518

Wehmeyer, M. L., Palmer, S., Smith, S., Parent, W., Davies, D., & Stock, S. (2006). Technology use by people with intellectual and developmental disabilities to support employment activities: A single-subject design meta-analysis. *Journal of Vocational Rehabilitation, 24*, 81-86.

Wehmeyer, M. L., & Shogren, K. A. (2013). Establishing the field of applied cognitive technology. *Inclusion, 1*, 91–94. doi: 10.1352/2326-6988-01.02.91

Wehmeyer, M. L., Tassé, M. J., Davies, D. K., & Stock, S. (2012). Support needs of adults with intellectual disability across domains: The role of technology. Journal of Special Education Technology, 27, 11–22. doi:10.1177/016264341202700203

Williamson, H. J., Fisher, K., Madhvani, D., & Talarico, L. (2019). #ADA25 campaign: Using social media to promote participation, social inclusion, and civic engagement of individuals with intellectual and/or developmental disability. *Inclusion, 7,* 24-40. doi: 10.1352/2326-6988-7.1.24

Table 1.
*Youth Characteristics and Experiences in Full Sample**

Items	Category	*n* (%)
Gender		
	Female	6330 (62%)
	Male	3820 (38%)
Race/Ethnicity		
	Non-Black	6720 (69%)
	Any Black	2000 (21%)
	Multi/Other	270 (3%)
	Hispanic	770 (8%)
Grade		
	7th grade	1950 (19%)
	8th grade	1850 (18%
	9th grade	1880 (19%)
	10th grade	1710 (17%)
	11th grade	1500 (15%)
	12th grade	1040 (10%)
	Ungraded/Other qualifying	210 (2%)
Disability – by IDEA Category		
	Autism	890 (9%)
	Deaf-blindness	100 (1%)
	Emotional disturbance	950 (9%)
	Hearing impairment	420 (4%)
	Intellectual disability	1020 (11%)
	Multiple disability	780 (8%)
	Orthopedic impairment	1000 (10%)
	Specific learning disability	1230 (12%)
	Speech language impairment	900 (9%)
	Traumatic brain injury	220 (2%)
	Visual impairment	220 (2%)
	504 plans but no IEP	530 (5%)
	Neither 504 plan nor IEP	1440 (14%)
Disability – 3 categories		
	IDD	2700 (27%)
	Other IDEA disability	5480 (54%)
	No disability	1980 (20%)
Rurality		
	City	3070 (32%)
	Suburb	3270 (34%)
	Rural or town	3400 (35%)
Low-income household		
	1% to 185% of poverty level	5230 (54%)
	Above 185% of poverty level	4650 (46%)

Note. *Indicates frequencies are rounded to nearest 10 per IES restricted-data requirement.

Table 2.
Independent and dependent variable description

Variable	Variable Label Used	Variable Description	Coding
Independent Variables			
IDD (created)	d_y_disability	Disability type	IDD Other IDEA disability No disability
Received social media instruction	K9m1	In school year {2011-2012/2012-2013}, did school staff provide you with instruction on appropriate use of social networking sites? *Social networking sites are ones like Facebook, Yahoo groups, and MySpace.*	Yes No
Usefulness of social media instruction	K9m2	How useful was instruction on appropriate use of social networking sites? *Social networking sites are ones like Facebook, Yahoo groups, and MySpace.*	Very useful Somewhat useful Not useful
Dependent variables			
Social media communication	y_y_socmediafriends	How often do you use each of the following to communicate with friends? How about [FILL ITEM]? Do you use that several times a day, once a day, several times a week, once a week or less, or never? Facebook, Twitter (sending or receiving tweets) and other social media	Often Rarely or Never
Texting	y_y_textfriends	How often do you use each of the following to communicate with friends? How about [FILL ITEM]? Do you use that several times a day, once a day, several times a week, once a week or less, or never? Texting	Often Rarely or Never
Sees friends	y_y_seefriends	During the past 12 months, about how many days a week did {you/he/she} usually get together with friends outside of school and outside of organized activities or groups?	Often Rarely or Never

Table 3.

Youth Experiences related to Social Media and Social Capital

Variable	Category	n (%) Overall	n (%) by disability				
			IDD	Other IDEA disability	No IDEA disability	X^2	*p*
Receives social media instruction							
	No	2970 (51%)	660 (56%)	1690 (49%)	620 (44%)	10.05	0.001
	Yes	2860 (49%)	530 (45%)	1600 (51%)	740 (56%)		
Usefulness of social media instruction							
	Not useful	200 (7%)	30 (5%)	120 (6%)	50 (7%)	3.77	0.05
	Somewhat useful	1080 (38%)	160 (29%)	560 (37%)	320 (44%)		
	Very useful	1590 (56%)	330 (66%)	880 (57%)	370 (50%)		
Communicates with friends through social media						46.14	0.0001
	Rarely	3660 (43%)	1040 (64%)	2000 (40%)	610 (33%)		
	Often	4830 (57%)	630 (36%)	2910 (60%)	1300 (67%)		
Communicates with friends through texting						85.94	0.0001
	Rarely	2650 (31%)	900 (55%)	1450 (29%)	300 (18%)		
	Often	5830 (69%)	770 (45%)	3460 (71%)	1610 (82%)		
Sees friends						68.36	0.0001
	Rarely	5090 (50%)	1760 (63%)	2640 (45%)	690 (34%)		
	At least once per week	5030 (50%)	920 (37%)	2830 (55%)	1290 (66%)		

Note. All frequencies are rounded to the nearest 10 per IES requirements for reporting of restricted-data. Frequencies represent participants per category. As required for any tests by disability, chi-squares were performed by the svy: command and represent the proportion based on the sampling stratum using the svy: command in STATA which allowed for analyses by analytic weight, the analysis stratum, and analysis primary sampling unit. Therefore, percentages by disability represent the cell proportion based on the sampling stratum and not the full sample.