Technology and Social Inclusion: Technology Training and Usage by Youth with IDD in the

*National Longitudinal Transition Study of 2012*

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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
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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 & Christopershen, 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.
further analyses used the \texttt{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 \texttt{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


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

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

Note. *Indicates frequencies are rounded to nearest 10 per IES restricted-data requirement.
Table 2.
Independent and dependent variable description

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable Label Used</th>
<th>Variable Description</th>
<th>Coding</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDD (created)</td>
<td>d_y_disability</td>
<td>Disability type</td>
<td>IDD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Other IDEA disability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No disability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Received social media</td>
<td>K9m1</td>
<td>In school year {2011-2012/2012-2013}, did school staff provide you with instruction on appropriate use of social networking sites?</td>
<td>Yes</td>
</tr>
<tr>
<td>instruction</td>
<td></td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Usefulness of social</td>
<td>K9m2</td>
<td>How useful was instruction on appropriate use of social networking sites? Social networking sites are ones like Facebook, Yahoo groups, and MySpace.</td>
<td>Very useful</td>
</tr>
<tr>
<td>media instruction</td>
<td></td>
<td></td>
<td>Somewhat useful</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Not useful</td>
</tr>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social media communication</td>
<td>y_y_socmediafriends</td>
<td>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</td>
<td>Often</td>
</tr>
<tr>
<td>Texting</td>
<td>y_y_textfriends</td>
<td>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</td>
<td>Often</td>
</tr>
<tr>
<td>Sees friends</td>
<td>y_y_seefriends</td>
<td>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?</td>
<td>Often</td>
</tr>
</tbody>
</table>
Table 3.

Youth Experiences related to Social Media and Social Capital

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n (%) Overall</th>
<th>IDD</th>
<th>Other IDEA disability</th>
<th>No IDEA disability</th>
<th>X²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receives social media instruction</td>
<td>No</td>
<td>2970 (51%)</td>
<td>660 (56%)</td>
<td>1690 (49%)</td>
<td>620 (44%)</td>
<td>10.05</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2860 (49%)</td>
<td>530 (45%)</td>
<td>1600 (51%)</td>
<td>740 (56%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Usefulness of social media instruction</td>
<td>Not useful</td>
<td>200 (7%)</td>
<td>30 (5%)</td>
<td>120 (6%)</td>
<td>50 (7%)</td>
<td>3.77</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Somewhat useful</td>
<td>1080 (38%)</td>
<td>160 (29%)</td>
<td>560 (37%)</td>
<td>320 (44%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very useful</td>
<td>1590 (56%)</td>
<td>330 (66%)</td>
<td>880 (57%)</td>
<td>370 (56%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates with friends through social media</td>
<td>Rarely</td>
<td>3660 (43%)</td>
<td>1040 (64%)</td>
<td>2000 (40%)</td>
<td>610 (33%)</td>
<td>46.14</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>Often</td>
<td>4830 (57%)</td>
<td>630 (36%)</td>
<td>2910 (60%)</td>
<td>1300 (67%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates with friends through texting</td>
<td>Rarely</td>
<td>2650 (31%)</td>
<td>900 (55%)</td>
<td>1450 (29%)</td>
<td>300 (18%)</td>
<td>85.94</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>Often</td>
<td>5830 (69%)</td>
<td>770 (45%)</td>
<td>3460 (71%)</td>
<td>1610 (82%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sees friends</td>
<td>Rarely</td>
<td>5090 (50%)</td>
<td>1760 (63%)</td>
<td>2640 (45%)</td>
<td>690 (34%)</td>
<td>68.36</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>At least once per week</td>
<td>5030 (50%)</td>
<td>920 (37%)</td>
<td>2830 (55%)</td>
<td>1290 (66%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.