Access to and use of the Internet among adolescents and young adults with intellectual disabilities in everyday settings

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ABSTRACT

Background: The aim of this study was to explore and describe access to the Internet and how it is used among adolescents and young adults with mild and moderate intellectual disabilities in their everyday settings.

Method: Data were collected through observations of and interviews with 15 participants with intellectual disabilities, aged 13–25 years, on access and use of the Internet in school or work and at home or in their free time. A qualitative content analysis was used.

Results: Main findings were categorised into: access to the Internet in different settings, challenges when using the Internet and strategies to handle the digital environment and take part in Internet activities.

Conclusions: This study revealed that participants had access to Internet connections and to a high number of Internet-enabled devices. Participants used the Internet through strategies when doing Internet activities, for example using pictures and reducing the number of Internet-enabled devices used in their everyday settings.

To use the Internet is an integral part of everyday life today and especially so for young people. In Europe, about 85% of those aged 11–17 years use the Internet (Olafsson, Livingstone, & Haddon, 2014). This is similar to adolescents in Australia where 82% reported using the Internet and of these 88% went online more than once every day (Australian Communications and Media Authority, 2016). In Sweden, where this study was conducted, the Internet use is even higher with over 90% of adolescents and young adults aged 12–25 years using the Internet on a daily basis to conduct their everyday activities such as searching for information and maintaining social contacts (Findahl & Davidsson, 2015).

Nevertheless, certain groups of people are at risk of being left behind when it comes to Internet access and use and one example is people with intellectual disabilities (Chadwick, Wesson, & Fullwood, 2013; Kennedy, Evans, & Thomas, 2011). In a literature review by Chadwick et al. (2013) with worldwide data, it has been demonstrated that persons with intellectual disabilities neither seem to access nor use the Internet to the same extent as the general population. Furthermore, these authors stressed that access to a digital device, such as a computer, does not imply actual use of it to conduct activities (Chadwick et al., 2013). Following this, the definitions of access to and use of the Internet in this study were based on the person-environment relationships concepts accessibility and usability, where accessibility comprises a personal and a physical environmental component. Usability highlights an activity component alongside the person-physical environment relationship i.e., the person should be able to use the physical environment and accessibility is a precondition for the opportunity to use the physical environment (Iwarsson & Stahl, 2003). In the present study, access to the Internet was explored from the participants’ perspective in their everyday settings, including physical environmental components such as Internet-enabled devices (e.g., computers, tablets, and smartphones), and how the participants used the Internet when performing their Internet activities.

For people with intellectual disabilities who may have deficits in intellectual and adaptive functioning in conceptual, social or practical domains, using the Internet can be a complex endeavour (American Psychiatric Association, 2013; Tassé, Luckasson, & Schalock, 2016). For example, cognition has an impact on word processing skills, which is an important digital competence when using the Internet (Wu, Chen, Yeh, Wang,
To overcome difficulties with digital literacy skills among persons with intellectual disabilities, different devices have been successfully used when teaching emailing (Cihak, McMahon, Smith, Wright, & Gibbons, 2015), and a cognitively accessible interface prototype has been developed for social media use, which showed support for increasing independent use of the Facebook (Davies et al., 2015). However, these studies were done with few participants in controlled settings and research is lacking on access and use in the everyday settings where Internet-enabled devices are to be used (Ólafsson et al., 2014).

Variables found in earlier studies that affect access to the Internet for persons with intellectual disabilities are individual disabilities as well as affordability, education and support (Chadwick et al., 2013). It is known from focus group interviews conducted in Sweden that staff and parents might control access to the Internet and that their attitudes towards opportunities and risks can both hinder and facilitate the young person's Internet use (Molin, Sorbring, & Löfgren-Mårtenson, 2015). International current research shows that social media use includes opportunities for social interactions, but the use is affected by not having devices for accessing the social media, having difficulties in literacy skills and facing safe-guarding from others (Caton & Chapman, 2016; Shpigelman & Gill, 2014). Further, the above-mentioned studies on Internet access and use concern younger adults with mild intellectual disabilities, parents and teachers. Research that includes younger persons with mild to moderate intellectual disabilities, and their perspectives on Internet access and contexts of its use is needed (Caton & Chapman, 2016; Ólafsson et al., 2014).

This study aimed to explore and describe access to the Internet and how it is used among adolescents and young adults with mild and moderate intellectual disabilities in their everyday settings.

Method

Study design

The study employed an inductive design using observations, including conversations, and follow-up interviews (Patton, 2015).

Ethical considerations

The Regional Ethics board of Linköping approved the study (141201; Dnr: 2014/370-31). General rules for ethical consideration were followed throughout the study and informed consent was collected from guardians and participants through information letters with consent forms. The information letters to the participants were adapted with easy read and picture-supported texts (Folkestad & Folkestad, 2000).

Recruitment of participants

Participants were recruited from municipalities in the middle region of Sweden and the special schools for persons with intellectual disability or the work settings of daily activity centres that persons with intellectual disabilities are entitled to attend after school in accordance to Swedish legislation (SFS, 1993:387).

A list provided by the National Agency for Education was used together with the municipalities’ web pages to contact principals of schools (9) and managers at the office of social affairs in charge of the daily activity centres (4). They identified staff at special schools and daily activity centres, bringing the total to 17. Purposive sampling was used (Patton, 2015) to include participants with mild and moderate intellectual disability of different ages.

Inclusion criteria were that young people with mild or moderate intellectual disability should be between 13 and 25 years old and identified by the contact person as Internet users. In Swedish special schools people with mild intellectual disability are enrolled in one type of school and persons with moderate or severe intellectual disability are enrolled in another, meaning that the type of school verified the severity of intellectual disability. For participants at the daily activity centres the severity of intellectual disability was stated by health professional staff at the activity centre, for example occupational therapists. Further, participants needed to be willing to be observed and interviewed about their Internet use, in school or work (i.e., the daily activity centres) and at home or in their free time.

Twelve contact persons provided names of participants based on the inclusion criteria, collected consent forms, and arranged the first meeting between participant and researcher. Participation was declined by one principal and three contact persons from different schools, claiming other research was taking place concurrently, a heavy workload or not having people who met the criteria. A further two contact persons did not identify any young people who were willing to participate.

Data collection

Data were collected through two or three observation occasions per participant, in everyday settings of school or work and at home or in free time with a follow-up interview with each participant with intellectual
disability. The focus of the data collection was on access to the Internet and how it was used by the participants in their different settings. All data collection was performed by the first author.

**Observations**

Participants were first observed in their school setting or in the work setting of their daily activity centre. The second observation took place in the home of the participant (parental home or municipal accommodated group home) or in their free time at school or during a work break. Two participants were observed on three occasions, as they worked at two different activity centres and used the Internet in both settings.

The focus of the observations was on the participant’s Internet access and use in the actual settings. During the first observation the participant was initially followed in his or her ongoing events in the setting, for example, during scheduled lessons in school or during working hours at the activity centre focusing on access and use of Internet. The observations included conversations as recommended by Patton (2015) and participants were subsequently asked to show how they accessed and used the Internet in the setting from questions such as: “Can you show me more of what you do [on the Internet] here?” and “Can you show me how you did that?” The observers’ role was overt (Patton, 2015) with full disclosure to everyone in the settings. Furthermore, the role of the observer was part spectator-observer when starting the first observation occasion, evolving into part participant-observer with involvement with the participants through the conversations (Patton, 2015). The second observation was carried out at a suitable time for participants during free time or in their homes, mostly during early evening hours, within a two-week period following the first observation. It started with collectively recalling the content of the first observation, followed by asking the participant in a conversational style to show how he or she accessed and used the Internet in the current setting. Observations varied between 2 and 6 hours per participant (M = 3.45), adding up to 56 hours in total and 32 observations, as two participants were observed in three settings.

During observations, field notes were written by hand in a field notebook, which described the course of events in chronological order in regard to the participants’ access to and use of Internet, alongside with the observer’s reflections (Patton, 2015). Audio-recordings of the observation occasions were made using a Dictaphone. Photographs were taken of the devices in the settings during all observations, resulting in a total of 269 photographs ranging from 4 to 52 per participant (M = 18). The photographs were to be used during follow-up interviews to help participants remember the events (Boxall & Ralph, 2009) and to specify which devices were being talked about. Transcriptions of the handwritten field notes were made by the first author close to the time of the actual observation and included the audio-recordings and the photographs as support to add detail to the transcriptions.

**Follow-up interview.** The follow-up interviews were conducted with each participant at the end of the last observation and are included in the total 56 h of data collection. The interviews focused on clarifying how the Internet had been accessed and used by the participants during the observation occasions and two recurrent questions were asked based on events during observations. The questions were: You showed me X [Your computer; Your Facebook account etc.] (a) how is it going with it? (b) How come? /Why? In addition, probing questions were used (Patton, 2015), formulated with easier wordings and in either-or format for example: was it working after that or was it not working? To exemplify the events referred to, the photographs were available during the interview for participants to use. However, participants also used their devices, such as smartphones or tablets to demonstrate their answers, for example, trying to log on to the Facebook account to show that it was still not working. The follow-up interviews were audio-recorded and transcribed verbatim.

**Data analysis**

Data analysis was inductive and data-driven, using qualitative content analysis (Patton, 2015). The unit of analysis was the transcriptions of the field notes, including descriptions of the photographs and the audio-recorded conversations during observations, and the follow-up interviews, which totalled 400 pages. The analysis started with a read-through of the transcriptions by the first author to get to know the material. The aim of the study (to explore and describe access to and use of the Internet) guided the analyses. Reflections and comments were written in the margins for further analysis (Patton, 2015). The transcriptions were then analysed on an individual basis from each of the settings. Internet connections in the settings and the number of Internet-enabled devices were mapped per participant (see Table 1). Coding of the text initially derived meaning units close to the text followed by condensation of the text into codes. Similarities and diversities across participants and settings were analysed through continuous readings of all authors resulting in further coding of the data. The codes were grouped under higher order headings, generating three categories and nine sub-
Table 1. Participants' demographics and access to Internet through Internet connections and Internet-enabled devices in different settings.

| Participantsa | Intellectual disability | Age (m = 18.5) | Special school/work at activity centre | Accommodation | Internet connections observedb describedc | Internet-enabled devices observedb describedc |
|---------------|-------------------------|----------------|----------------------------------------|---------------|------------------------------------------|---------------------------------------------|
| Penelope (F)  | Mild                    | 14             | Compulsory school                       | Parental home with siblings | S             | Tablet, Game console, Smartphone, Desktop computer |
| Kylie (F)     | Mild                    | 14             | Compulsory school                       | Parental home with siblings | S H M         | Smartphone, Laptop, Tablet, Desktop computer |
| Shrin (F)     | Mild                    | 16             | Upper secondary school                  | Parental home without siblings | S H –         | Tablet, Desktop computer, Smartphone |
| Lisa (F)      | Mild                    | 16             | Upper secondary school                  | Parental home with siblings | S H M         | Smartphone, Desktop computer, Tablet, Game console |
| Molly (F)     | Mild                    | 16             | Upper secondary school                  | Parental home with siblings | S H M         | Smartphone, Desktop computer, Tablet, Game console |
| Marcus (M)    | Mild                    | 23             | Daily activity centre                   | Parental home without siblings | – H M        | Smartphone, Desktop computer, Game console |
| John (M)      | Moderate                | 13             | Compulsory school                       | Parental home with siblings | S H M         | Tablet, Tablets (2), Game consoles (2) |
| Naomi (F)     | Moderate                | 17             | Upper secondary school                  | Parental home without siblings | S H M         | Tablet, Smartphone, Desktop computer, Laptop, Game console |
| Amy (F)       | Moderate                | 19             | Upper secondary school                  | Parental home with siblings | S H M         | Smartphone, Tablets (2), Smart TV, Desktop computer, Laptop, Game console |
| Simon (M)     | Moderate                | 19             | Upper secondary school                  | Parental home with siblings | S H M         | Tablets (3), Smartphone, Laptop, Smart TV, Game console |
| Ella (F)      | Moderate                | 20             | Upper secondary school                  | Parental home without siblings | S H M         | Tablets (2), Smartphone, Laptop, Desktop computer, Smartphone |
| Tina (F)      | Moderate                | 21             | Daily activity centre                   | Parental home without siblings | W H M         | Desktop computer, Smartphone, Game console, Laptop, Tablet |
| Cecilia (F)   | Moderate                | 22             | Daily activity centre                   | Own apartment in group home | W H –         | Tablets (2), Desktop computer, Smartphone |
| Fredrik (M)   | Moderate                | 24             | Daily activity centre                   | Parental home without siblings | W H –         | Laptop, Smartphone |
| Nina (F)      | Moderate                | 24             | Daily activity centre                   | Own apartment in group home | W H –         | Laptops (2), Smartphone |

a All participants’ names are fictive.
b Observed to be used (in bold).
c Described having access to (not in bold).
d The number in brackets shows the number used of that type of Internet-enabled device.
categories. For example, the category Access to Internet in different settings, includes the two subcategories: Internet connections and Internet-enabled devices, grouped from codes like Wi-Fi, connection on smartphone and tablet, laptop and desktop computer. Two categories (Challenges when using the Internet; Strategies to handle the digital environment and take part in Internet activities) each included between two and five subcategories respectively. The formulation of categories was discussed and agreed upon between the three authors. This was followed by re-readings of the transcriptions by all authors to enhance credibility and dependability, ensuring that findings were not excluded and that data was stable in the categories (Denzin & Lincoln, 2011). Quotes were selected from the back-reading.

Results

Participants

Participants were 15 adolescents and young adults with mild and moderate intellectual disabilities between 13 and 25 years old from six different municipalities. Table 1 presents the demographics of the participants and their access to Internet connections and Internet-enabled devices in the different settings. Of the participants, 6 had mild and 9 had moderate intellectual disabilities. All communicated verbally, though some had difficulties articulating and a few used sign languages in combination with verbal speech. All but 2 lived in their parental homes and of these 10 were in school (Table 1). The participants were observed doing a variety of Internet activities in the settings, for entertainment through movie-clips, music, games and for social networking through social media or using Internet as a communication tool. Most participants were also searching for information and facts.

Access to the Internet in different settings

Internet connections

All participants were observed having access to the Internet at school, and all except for one participant had Internet access at work, as is shown in Table 1. Access to Internet at home was observed or described among all participants and many participants had Internet connections when mobile, although some participants lacked Internet connection on their smartphones (see Table 1). A reason described by themselves for not having Internet connection on the smartphone was high costs, related both to setting up an Internet connection in the first place and not having sufficient money to renew subscriptions or buy data to allow continued use of the Internet. Analysis indicated that this limitation was most evident among the young adults. Adolescents stated that their parents payed for their Internet connection.

Limited access to Internet connection in the home-setting was observed for the two participants living in their own apartment in accommodated group homes (see Table 1). In Nina’s and Cecilia’s group home no Wi-Fi was available for them as residents although it was described as available to staff in the group home building. Internet connections were arranged on a device or in their apartment and were sometimes problematic. For example, when Cecilia was observed in her apartment in the group home, she spotted on her tablet that her Internet connection was not working, and she walked out of the apartment to find the staff. Cecilia found them in the common kitchen area and she said: “The Internet’s not working now. The staff is baking and one of them says: ‘Well, I am not that technical you know... When’s your Mum coming next?’” These field notes indicate that in this group home, Internet connections were not included in the staff’s work as the staff referred the participant back to her mother when she asked for support. It also indicates that staff did not have the necessary knowledge to support Cecilia in this issue. This in turn resulted in Cecilia being without access to the Internet for certain periods in her own home, something that was not observed for any participant living in their parental home.

Internet-enabled devices

As Table 1 shows, participants were observed having access to and use of two to four different Internet-enabled devices per person when accessing the Internet, although they described having as many as seven devices. Different Internet-enabled devices were observed to be used in different settings. In the school setting, Internet-enabled devices were provided by the schools on a personal level and the personal tablets were the most often observed used device. At work at the daily activity centre, on the other hand, most Internet-enabled devices used were shared with others, such as desktop computers and tablets. In free time at school, work or at home, personal smartphones and tablets were often used, bought by parents or inherited from a relative or a family member. Computers, gaming consoles and smart TVs were often observed to be shared with others at home. Adolescents living at home with siblings said that siblings helped with talking parents into buying Internet-enabled devices.

Some personal Internet-enabled devices were observed to be used by participants only in a specific
setting when accessing Internet, and for that reason the devices were treated as fixed in location, even if they were portable. For example, personal tablets in schools had to stay in the schools due to safety policies. Personal smartphones could be kept at home during the school day to prevent them from being stolen or lost, a decision often made by parents or participants themselves. This meant that some Internet-enabled devices were setting-specific and for that reason participants had to use different ones when moving between settings.

**Challenges when using the Internet**

**Reading, writing and spelling**
While participants were observed using the Internet, their intellectual functioning appeared to be challenged to varying degrees due to problems experienced with reading, writing, and spelling. Kylie, 14 years old, with mild intellectual disability said about searching for information on Internet: “One difficult thing is to find things on the Internet if words are long and I need help with spelling”. Challenges with both reading and writing were expressed by Tina, a 21-year-old woman with moderate intellectual disability:

Tina (T): “If I want search on the Internet on … something … Pugh! Damn difficult it is.”
Observer (O): “What is?”
T: “Letters. Ah … Pugh! Getting them right.”
O: “A-ha … So letters are difficult … Why is it difficult for you?”
T: “Okay. Like this. In your head letters go like this. [Showing with her two index fingers how they meet when moved towards each other]. In my head, letters go like this. [Showing the index fingers missing each other when moved towards each other].”

These quotes from Kylie and Tina concerning their difficulties with reading and writing indicated that they had different challenges with spelling when using the Internet for information searching. Kylie experienced occasional difficulties with spelling, indicating that she could manage spelling at most times. Tina’s experiences included overall difficulties using letters both for reading, writing and spelling.

**A rapidly changing digital environment**
Besides the problems of spelling and reading, the digital environment was observed to be challenging and hindering to participants when using the Internet. The digital environment can most often be characterised by ongoing rapid changes with updates of software or new Internet-enabled devices bought to the schools. It was observed that participants had problems using updated versions of operating systems or learning new applications that were released on the social media or games market. John explained this when playing a football game, FIFA, at his Mums tablet: “Really I think the old version of FIFA was easier. I played it on the TV, on the Play Station. I haven’t learnt the new FIFA 16 that well.”

In this quote, John was sharing his experience when things change, and he could not use previous experience when using the Internet, for example, to play games, which often get updated. It is an example of the special demands imposed on participants by the digital environment (i.e., constantly having to face changes when using the Internet).

A key feature of the digital environment is that codes to unlock the different Internet-enabled devices are needed to even access and start to use the Internet. Further, user names and passwords may be necessary, for example to download apps for playing games or enter social media for social networking. Most participants experienced an overall cessation in their Internet use due to these challenges.

**Strategies to handle the digital environment and take part in Internet activities**

**Getting support from others**
A strategy that was commonly used by participants to access and use the Internet was getting support from others, such as parents, siblings or staff. During observations in school or at work, participants occasionally asked peers for help with accessing the Internet or doing Internet activities. In free time or at home, siblings or relatives the same age as the participant themselves, were most often described as the ones who knew about and showed the participants how to do Internet activities and how to surf the Internet.

**Word-based strategies**
Correctly spelled notes, handwritten by participants themselves or by others, were frequently used when searching the Internet for information or for movie-clips. The notes included codes, passwords or names of things participants wanted to search for. They were observed to be kept close, for example in the cases of devices. This strategy was used by participants with both mild and moderate intellectual disability in different ways to meet their individual needs and to enable them to take part in Internet activities. Marcus, with mild intellectual disability, liked gaming and had a long note, handwritten by himself next to his computer on how to reach higher levels in the game he often played. Nina, with moderate intellectual disability, tried to search for a music-artist on her laptop looking at a note containing names of the artists she liked in block
letters, handwritten by staff. Participants with moderate intellectual disability, such as Nina, were often observed to type a few letters of a word into a search engine, recognise the suggestions that came up, and then click one in the scroll lists. This often meant finding what was searched for, although observations also showed the opposite and participants had to discontinue the search.

**Picture-based strategies**

Participants who experienced severe difficulties with reading were observed to click on pictures and videos when searching for information or facts on the Internet in a search engine, and then found what they were looking for. When starting an Internet activity, for example social networking through FaceTime or Skype, apps were often observed to be used among most participants. The app icon became a picture-based strategy when starting an associated file or program as it appeared as an image on the home screen on the tablet or smartphone. For example, John was using his mother’s tablet when he suddenly wanted to show the observer a funny movie-clip on YouTube:

He changes to his own smartphone that is still lying on the table…

Observer: “So why did you change to the smartphone?”

John: “I have the app here, the You tube-app. Much easier then.”

This showed that he preferred using the app icon and he indicated he had the ability to handle it. The ability to recognise the icons was evident among all participants, observed for example when downloading new apps for entertainment or social networking on devices.

To use picture-based strategies some participants used more than one Internet-enabled device at the same time. For example, some participants filmed things with the smartphone from the screen of the laptop or desktop computer, saving the film to be looked at later. This meant not needing to search for the movie-clip again, something participants said took a long time.

**Voice-based strategies**

Several participants had Internet-enabled devices that included voice-control and support options such as a microphone, although few were observed to use these when doing Internet activities for example updating posts on social media or searching on the Internet. Naomi used the Siri service on her smartphone when searching for Internet-activities for entertainment, and she said to the observer at a break at school:

Naomi: “Did you know it is working to use the voice thing?”

Observer: “Wow! Can you show me?” She puts it on, on the smartphone, holding the phone up to her mouth and says: “Beauty and the beast” [in English]. On the smartphone screen a movie clip from that movie is shown from the source YouTube. Naomi says: “See? It always works. Especially on the mobile. And if I speak English. Not always on the tablet.”

This quote shows that she used a voice-based strategy available on devices for searching the Internet to find a movie-clip. A few participants said they knew of the Siri service but were observed to be unable to get it to function when trying to use it due to difficulties articulating.

**Reducing and personalising devices**

All participants had some Internet-enabled devices not being used, both in school and at home. For example, laptops kept in the lockers at school or packed in bags at home. By doing this they were reducing the number of Internet-enabled devices being used. Regardless of setting, it was observed that all participants preferred to use personal devices, often with touchscreens and an interface with apps, for example YouTube, that were arranged according to their personal preferences on the starting screen. Simon, for example, was using a laptop at home when showing a saved movie-clip from YouTube on it, but changed to his smartphone when asked if he wanted to show something else on the Internet:

Simon nods and says: “Yeah. Come.” He gets his smartphone from the table.

Observer: “Why didn’t you use the laptop?”

Simon: “Nah. It is no good. And it is Emma’s too [his younger sister].”

The smartphone he changed to had a starting screen of his own choice, where things were available in a familiar order.

A few participants, all in activity centres, had individually adapted laptops with assistive devices. The assistive devices that had been installed were, for example voice-control, synthetic speech, scanning mouse, touchscreen, or an adjusted start screen with selected applications. Fredrik, 24 years old, with moderate intellectual disability, was observed emailing at work on his laptop using a simplified emailing program and the assistive devices of a microphone and earphones. He dictated emails and listened to them before he pressed “Send”. This showed a possibility for him to email even though he was unable to read and write, an Internet activity not many other participants were observed to take part in. Furthermore, it was observed that participants with access to individually adapted devices took them between the work setting and their home, which was rarely observed to be done by participants without such devices.
Discussion

This study set out with the aim of exploring and describing access to the Internet and how it was used among adolescents and young adults with mild and moderate intellectual disabilities in their everyday settings. The results revealed that young participants with both mild and moderate intellectual disabilities had access to a large number of Internet-enabled devices and to Internet connections in most settings. Analysis even revealed that the participants had access to more Internet-enabled devices than they used. In Sweden, people in the general population are reported to have a combination of Internet-enabled devices, especially in families with children living at home, where 87% have several computers, smartphones, tablets and gaming consoles in their homes (Findahl & Davidsson, 2015). This is in line with the results of this study, where most participants lived in their parental home. However, the findings in this study of having access to many Internet-enabled devices are contrary to previous studies with persons with intellectual disabilities suggesting that they are less likely to have access to and use the Internet than the general population (Chadwick et al., 2013). A possible explanation for this contradiction is the age of the participants, with young people participating in the present study, and adolescents access the Internet to a greater extent than adults do, especially older people (Findahl & Davidsson, 2015). Studies showing that the general population have greater access to the Internet have included people of various ages with intellectual disabilities (Chadwick et al., 2013; Tanis et al., 2012).

The unanticipated finding of having more Internet-enabled devices than accessed and used may be a result of devices not being taken to different settings by the user. Devices were sometimes treated as if they were fixed to a location despite being portable. One reason for this was school policies stating that devices had to stay in the schools for safety reasons. There are, however, other possible explanations. The high costs identified in the study, with Internet connection being too expensive to have on devices for some participants could be one explanation. This meant that Internet-enabled devices were not connected to the Internet in settings where Wi-Fi was not available. Costs of devices are often referred to in studies as a reason for not having access to the Internet (Chadwick et al., 2013; Tanis et al., 2012) but this study highlighted the differentiation between having Internet-enabled devices and having access to Internet connections on the devices. This is in line with a recent literature review (Lussier-Desrochers et al., 2017) that highlights access as complex, involving both direct and indirect costs for devices and Internet connections, and being one of five crucial dimensions for digital inclusion for persons with intellectual disabilities. Recognising this complexity with access may lead to gaining the benefits of accessing and using the Internet for young persons with intellectual disabilities, rather than simply having the Internet-enabled devices per se, as has been shown previously are not enough to ensure their use (Chadwick et al., 2013).

Yet another explanation for not using all the Internet-enabled devices may be the finding that the staff in the accommodated group home claimed not having knowledge to assist residents with the Internet, and therefore the Internet-enabled devices were not used. In a study on policies of organisational support on Internet use for persons with intellectual disabilities in Sweden, the results showed an overall lack of knowledge and education about Internet use among both staff and the persons with intellectual disabilities themselves (Ramsten, Marmstål Hammar, Martin, & Göransson, 2017).

Another interesting result of this study was that the Internet was used by all participants through various strategies that enabled participation in Internet activities. One strategy found is in line with the result of having access to more Internet-enabled devices than used, and it is the strategy of reducing the number of Internet-enabled devices and preferring the use of personal ones. This can be interpreted as a direct adaptation to handle the rapidly changing digital environment with different codes on devices and new software to navigate. Despite the finding of the challenging digital environment the results showed that very few participants had specially and individually adapted Internet-enabled devices with assistive devices. This may explain the individual need to change to the most personalised Internet-enabled device when possible in each setting. In studies on developing or teaching cognitively accessible interface to persons with intellectual disabilities, its use in everyday settings or over time was reported to be lacking (Cihak et al., 2015; Davies et al., 2015).

Furthermore, word-, picture-, and voice-based strategies were used when, for example, searching on the Internet. This can be viewed as environmental compensation for digital skills and competencies in the individual, such as literacy skills, when doing an Internet activity. This is in line with recognising the importance of integrating both the person, the physical environment and the activity component when exploring and describing accessibility and usability (Iwarsson & Stahl, 2003). Similar strategies and solutions have previously been described among web designers as important cognitive adaptations to enhance the accessibility to and usability of the Internet for users with intellectual disabilities. However, research has highlighted that universal design
needs to recognise the varying needs of persons with different levels of intellectual disability and that challenges cannot be solved by universal design of the web but have to include individual adaptations, education and support (Kennedy et al., 2011; Ramsten et al., 2017). The need for support from others was one of the strategies found to be used in this study, indicating that although strategies in the physical environment were used, support from others was needed to access and use the Internet to enable taking part in Internet-activities for the participants.

Methodological considerations need to be addressed, one of which is the inclusion criterion of using the Internet, as it could have resulted in the extensive access to the Internet found in this study. However, use of the Internet in the inclusion criteria was explained to the contact persons as meaning using the Internet in different ways, including often, infrequently or in one setting. Furthermore, the use of observations for a few hours at a time in the settings could have affected the results since the participants may not have had an opportunity to use their Internet-enabled devices, or they may have overused the Internet during the time set for the focused observations in each setting. Finally, when interpreting the findings of this qualitative study, generalisations of the results cannot be made (Denzin & Lincoln, 2011), although the study has provided knowledge that suggests ways to access and use the Internet for adolescents and young adults with intellectual disabilities in everyday life. This knowledge can be used in future research to survey Internet access and use among a larger sample from the population.

Important practical implications for persons with mild and moderate intellectual disabilities to take part in Internet activities are that Internet-enabled devices should be limited in number and an Internet connection guaranteed, either through mobile data or through Wi-Fi. Other possible implications are to recommend personalising Internet-enabled devices, or adapting them individually with assistive devices, and making it possible to take Internet-enabled devices between settings where people with intellectual disabilities live their everyday lives. The strategies found in this study of reducing the number of Internet-enabled devices and using pictures, easier written texts, and voice-control systems are solutions the young person’s themselves used to improve their Internet use. These resources among young people with intellectual disabilities are vital for staff to acknowledge when giving practical support to people with intellectual disabilities in their Internet use.

In conclusion, this study revealed that participants had access to Internet connections and to a high number of Internet-enabled devices. However, the many devices in the digital environment were a challenge for the young people with intellectual disabilities to handle when using the Internet. With the strategies found in this study, the young persons with both mild and moderate intellectual disabilities had tools to take part in Internet activities and may be considered as part of the digital generation.

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