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'If the phone were broken, I'd be screwed': media use of people with disabilities in the digital era

Antonia Baumgartner, Tobias Rohrbach and Philomen Schönhagen

Department of Communication and Media Research, University of Fribourg, Fribourg, Switzerland

ABSTRACT

Digital media have become integral to the everyday life of people with disabilities. So far, research about disability and digital media use is rather scarce and narrowed on issues of accessibility and social media. This paper draws on qualitative interviews with people with visual or motoric impairments to provide an in-depth analysis of their everyday experiences relating to barriers and benefits of digital media. The findings reproduce previously identified barriers and extend these by adding novel sub-aspects of individual cognitive and attitudinal barriers like non-use of digital media due to their (perceived) complexity and a feeling of greater dependence on digital technology. However, the results also shed light on highly individualized ways that people with disabilities actively make use of digital media to improve their daily life. Despite persisting and new barriers, the general findings suggest that, with the appropriate training and support, digital media are largely beneficial.

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KEYWORDS

Disability; digital media; media use; everyday life; accessibility

Points of interest

- About 15 percent of the population worldwide are directly concerned by the issue of disability and digital media (for example smartphones, apps, online news).
- In this study, forty people with visual or motoric impairments were interviewed about their everyday experiences with digital media. They reported both benefits and problems of digital technology.
- Benefits: digital media allow people with disabilities to lead a more independent life; for example, shopping without assistance, reading the newspaper, or using social media.
- Problems: fear of technology, feeling dependent on digital devices, and lack of know-how are obstacles for digital media use. Increasingly complex websites and apps create additional barriers.
- A solution would be individual support and training.

CONTACT Antonia Baumgartner  antonia.baumgartner@unifr.ch

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Introduction

According to estimates of the World Health Organization (2011) about 15 percent of the population worldwide are concerned by a form of disability. The United Nations Convention on the Rights of Persons with Disabilities (CRPD) demands equal participation in all parts of society including access to information and barrier-free communication (United Nations 2006). This right particularly applies to the context of digital media and communication, as they play a crucial role for the participation in public and private life (Antener 2015; Ellis and Goggin 2015).

Previous research has repeatedly demonstrated that (digital) media present a vital means of being, feeling, and taking part in society as well as a valuable source of information for people with disabilities (Bosse and Hasebrink 2016; Goggin and Newell 2007; Lindsay et al. 2007; Mirza et al. 2006; Zaynel 2017). From this optimistic perspective, digitalization is considered an opportunity for more inclusive and accessible media (Berger et al. 2010; Zaynel 2017), allowing for flexible adaptations to specific living conditions (Haferkamp 2014). Cumming et al. (2014, 999) call mobile technology 'tools of empowerment' for people with intellectual disabilities. At the same time, disability and new media are discussed more skeptically in the context of a looming 'digital divide' (Jaeger 2012). Notions like 'disability divide' (Berger et al. 2010; Dobransky and Hargittai 2006), 'digital disability' (Yu et al. 2019), and 'digital disability divide' (Dobransky and Hargittai 2016; Sachdeva et al. 2015) indicate a mismatch between what is desired and the current state of matters. Despite its potential, digitalization bears specific problems for people with disabilities. Hence, a more realistic position would cast digitalization as neither solely beneficial nor detrimental but instead emphasize the complex and ambivalent interaction between disability and digital technology (Alper et al. 2015). However, scholarly work in the field of communication and media research on media use in the everyday life of people with disabilities and digital media is scarce (Ellis and Goggin 2015). In addition, there is little qualitative research dedicated to the in-depth exploration of the interplay between disability and digital media (Ellis and Goggin 2014; Seale and Chadwick 2017). This paper addresses both of these gaps by investigating the benefits and barriers in digital media use in the everyday life of people with visual or severe motoric impairments by means of qualitative interviews.

Theoretical background and literature review

The social model of disability

Disability studies advocate a social model of disability opposed to the individual model that has been, and still is, widely spread in society and research

(Oliver 1983, 2009; Shakespeare 2010). The individual model considers impairment a personal tragedy and an individual problem of the concerned person. Ultimately, medicine and rehabilitation should be the remedy for this problem in a way that 'normalcy' is enforced. The social model, however, regards disability as a social construct. Not the impairment itself but the barriers constructed in and by society are disabling. In this model, the distinction between the terms *disability* and *impairment* is central: disability stresses the obstacles created by society while impairment refers to functional (physical) limitations (Barnes and Mercer 2010). The social model does not assume a causal link between impairment and disability, i.e. barriers are constructed by society; they are not caused by impairment (Thomas 2004). For research on disability this entails a shift in focus from individuals toward processes on a social level (Zander 2016).

The social model has been criticized on various aspects (see e.g. Gabel and Peters 2004; Shakespeare 2010). Waldschmidt (2005), for example, argues that not only disability but impairment, too, is socially constructed, i.e. the medical categories of impairment are not ahistorical facts but are products of social construction. The social model has also faced criticism for downplaying biological and mental conditions (Anastasiou and Kauffman 2013). Swain and French (2000) criticize that the social model, like the individual model, conceives of impairment as a problem that requires a solution. This criticism and alternative models are important for the field but not essential for this paper. Like this study, the social model and its refinement (Oliver 2013) as well as the suggested alternatives (see e.g. Swain and French 2000; Waldschmidt 2005) are ultimately interested in the everyday experiences of people with disabilities in society.

Media use in everyday life

Two approaches from communication and media research that contextualize media use in everyday life serve as theoretical basis for this study. The first approach is Rosengren's (1995) lifestyle concept that investigates how media use is determined by media users' everyday life. The concept illustrated in Figure 1 below distinguishes three ways in which everyday life influences media use: the form of life, the way of life, and the lifestyle.

The *form of life* encompasses the structural conditions that shape media users' abstract environment like industrialization, urbanization, and religion. To understand the structural conditions of media use of people with disabilities, it is necessary to respect disability as a social construct, i.e. how society and its macro parameters treat people with impairments. Important considerations regarding the form of life are the social inclusion or isolation of people with disabilities and the accessibility of media contents (Huber

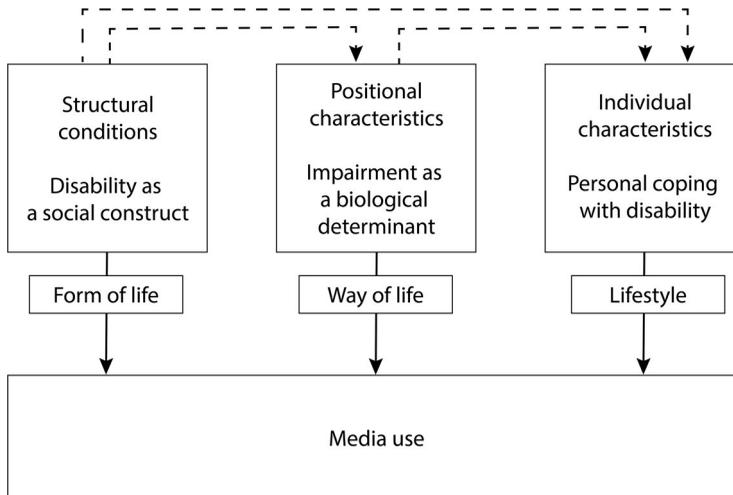


Figure 1. Determinants of media use specific to people with disabilities (own figure based on Rosengren [1995, 16] and Huber [2004, 62]).

2004). This first aspect of the lifestyle concept thus relates to the notion of disability in the social model of disability (cf. section ‘The social model of disability’). These structural conditions influence not only media use but also certain positional characteristics and media users’ individual traits.

The *way of life* is marked by media users’ positional characteristics, i.e. the combined biological and social characteristics related to users’ position in a given social matrix, like sociodemographic markers (gender, age, ethnicity, formal education, profession, etc.). The positional characteristics ask how impairment (functional limitations) as a biological determinant affects media use. People with blindness, for example, cannot fully access visual contents, from which may arise group specific patterns of media use (Huber 2004). As functional limitations cannot be neatly separated from processes of social construction (Waldschmidt 2005), they can also give rise to positional characteristics of disability that include social determinants, such as profession and in some cases formal education. The positional characteristics thus only roughly correspond to the notion of impairment according to the social model of disability. They influence media use as well as a person’s lifestyle.

The *lifestyle* includes media users’ individual traits like personality, values and beliefs. The model especially stresses the importance of structural conditions and positional characteristics since they also impinge on individual characteristics and consequently determine all patterns of action and media use. That is, the way a person copes with their impairment and disability affects media use as well. Assumingly, people with a positive attitude toward their impairment and disability will actively face inaccessibility and make use of assistive or adaptive technology or ask for help. All these aspects condition the emergence of specific patterns of media use (Huber 2004).

While the lifestyle concept (Rosengren 1995) is interested in how media use is determined by structural conditions as well as positional and individual characteristics of media users, structure-analytical reception research (Charlton and Neumann 1990) reconstructs the reasons for media use. As such, structure-analytical reception research conceives of media users as active and autonomously acting individuals (Charlton and Neumann 1990). It takes into account both structural aspects (outside conditions), like the general socio-cultural conditions or specific experiences made through the interaction with the environment, and procedural aspects (internal conditions), like cognitive competencies, knowledge and needs, that partially constrain the users' choice. Crucially, however, media users have a certain degree of freedom to decide what media they use and how. This framework's underlying assumption is that media use not only develops in everyday practice but can also retroact on it. In this sense, media use may represent a means of coping with everyday life and assertion of identity and thus also shape the lifestyle of individuals (Neumann-Braun and Peltzer 2017). Within this framework it could be argued, for example, that the exclusive use of community media related to impairment and disability topics may shape social contacts in daily life.

Both these approaches, the lifestyle concept and the structure-analytical reception research, contextualize media use in specific social situations and everyday life in general. Taken together they provide a basis to investigate the specific conditions and characteristics of media use of people with disabilities.

Literature review: (digital) media use of people with disabilities

This section first provides an overview of past research about media use of people with disabilities in general before detailing areas of concrete benefits and barriers of digital media. Studies about media use of people with disabilities are relatively rare and rather fragmented (Haferkamp 2014). An exception is a more recent and extensive scientific report about media use of people with disabilities in Germany (Bosse and Hasebrink 2016). This report indicates that, generally, people with disabilities watch more TV than people without disabilities. It seems that classical TV is considered a better opportunity for inclusion than online offers, which is in line with one of the most important motives for media use of people with disabilities, i.e. the ability to join follow-up conversations and to not feel lonely (Adrian et al. 2017; Bosse and Hasebrink 2016). For other media, there are differences in use according to the type of impairment: print newspapers play an important role for people with hearing impairments, but are less important for people with learning, visual, and motoric impairments. Compared to the other groups (visual, motoric, learning) the radio is least popular among people with

hearing impairments. Finally, the internet is popular with all groups but least used by people with learning impairments (Bosse and Hasebrink 2016).

Turning to the use of digital media, a lack of access to digital technologies is an obstacle for many people with disabilities (Macdonald and Clayton 2013). In 2006, they were less likely found to live in households with computers (Dobransky and Hargittai 2006) and they seemed to spend less time online than the general population (Bosse and Hasebrink 2016; Dobransky and Hargittai 2006). The difference to the general population was particularly marked for people with learning (Bosse and Hasebrink 2016) and intellectual impairments (Caton and Chapman 2016). However, the gap in online media use may be on the decline as internet access for people with intellectual impairments has improved over the past years (Chadwick, Wesson, and Fullwood 2013). This is central because a lack of access to digital resources may negatively affect social inclusion, education and work, and overall quality of life (DiMaggio et al. 2004).

A great deal of studies of digital media use of people with disabilities focused on the use of social media. The motives for the use of social media are similar between people with and without disabilities: information seeking and communicating with family and friends as well as entertainment are some of the most central aspects (Mayerle 2015; Morris et al. 2016; Vanden Abeele, de Cock, and Roe 2012). A study about Twitter use of people with blindness also found a couple of important impairment and disability related motives like information seeking regarding blindness and advocacy related to blindness (Morris et al. 2016). The use of Facebook, too, does not differ greatly between people with and without visual impairments (Wu and Adamic 2014). A survey reached the same conclusion for people with different kinds of impairments (Shpigelman and Gill 2014).

Benefits of digital media use

Generally, digital media have brought people with disabilities benefits like increased access to information (Stienstra, Watzke, and Birch 2007), independence (Berger et al. 2010; Darcy, Maxwell, and Green 2016; Kane et al. 2009; Mirza et al. 2006; Vanden Abeele, de Cock, and Roe 2012), self-expression (Chadwick, Wesson, and Fullwood 2013), social interaction (Chadwick, Wesson, and Fullwood 2013; Guo, Bricout, and Huang 2005; Mirza et al. 2006) and learning opportunities (Chadwick, Wesson, and Fullwood 2013). Digital technology has also increased independent mobility and orientation (Ellis and Goggin 2014). These aspects are not exclusive to people with disabilities but equally benefit people without disabilities.

Benefits more specific to people with disabilities have been identified as well: in an online environment, impairment is not central to getting in touch and communicating with people. In a German study, participants with

different kinds of impairments indicated that it was easier to communicate online as they experienced less prejudice in online communication (Berger et al. 2010). Similarly, youths with mobility difficulties or visual impairments in a Norwegian study appreciated being able to communicate without the perceived stigma of impairment (Söderström 2009).

Research also found that the often less formalized language used online is an advantage for people with intellectual impairments, because they are not expected to use correct grammar and spelling. Additionally, they can express themselves through emoticons and symbols instead of more complex written text (Löfgren-Mårtenson 2008).

Barriers in digital media use

Previous research has described various problems regarding the accessibility and use of digital media by people with disabilities. It is essential to note that barriers and needs differ depending, inter alia, on the nature of impairment and disability, the current age of the person, and the time when the impairment developed (Haage and Bosse 2019).

Technical barriers. A central aspect in terms of technical barriers is the development of new and the constant updating of older technologies. Goggin and Newell (2007, 160) noted that ‘the introduction of new technologies sees people with disabilities overlooked, omitted, neglected, and not considered’. An example of such a development is the launch of Apple’s iPhone. The first version of the new touchscreen-based device was not accessible to people with visual impairments or blindness. It took two full years until a new version with a built-in screen reader made the smartphone more accessible (Ellis and Goggin 2014).

The fact that assistive and adaptive technology often lags behind the development of new technology was noted in studies on internet use of people with disabilities (Dobransky and Hargittai 2006; Vicente and López 2010). Additionally, a study found tendencies toward decreasing accessibility in mobile phones (Kane et al. 2009). Investigating the use of social networking sites by people with blindness, Voykinska et al. (2016) found that constant updates and consequent changes in the interface of websites caused difficulties in orientation.

People with motoric impairments sometimes experience difficulties operating devices. For them, the design of a product is decisive (Adrian et al. 2017). Most digital devices require some degree of sensorial and motor abilities (Dagenais, Poirier, and Quidot 2012) which represents a problem for people who cannot operate a keyboard, a mouse, or a touchscreen because of a lack of manual dexterity or upper-limb coordination (Dagenais, Poirier, and Quidot 2012; Wong et al. 2009). Since these aspects are mostly linked

to the ignorance of impairment-related aspects in the development and refinement of products, technical barriers are an issue of structural conditions in terms of the lifestyle concept.

Editorial barriers. Editorial barriers comprise two tightly related issues that ultimately come together in one website or app. For this reason, the following section addresses barriers of both these aspects of content presentation, i.e. issues related to how content is programmed and laid out as well as issues related to editorial decisions on content.

People with disabilities often face barriers due to the way the contents of a website are presented (Asuncion et al. 2012; Bernasconi 2007; Morris et al. 2016). These aspects are particularly central for people with visual impairments or blindness. Screen readers, for example, often cannot access dynamic websites. Interactive elements (like audio and video players) are sometimes difficult or impossible to operate with the available assistive technology (Leahy and Ó Broin 2009). This shows that the availability of assistive technology does not suffice to grant accessibility, but the programming of websites and applications must also be compatible with this technology (Hollier 2017). Further problems arise when unwanted additional data is loaded, which is time-consuming and forces the users to search the contents of interest among other contents (Guerreiro and Gonçalves 2013). In this context, advertisements integrated in the main text (Berger et al. 2010) or before the main content (Loureiro, Cagnin, and Paiva 2015) proved particularly tedious.

Editorial decisions on content add to the previously mentioned programming issues. Lack of alternatives to visual content represents a general problem for people with visual impairments. This is the case when captions or other forms of descriptions for images and videos are not available (Bosse and Hasebrink 2016; Söderström 2009) or when visual elements or input boxes of online forms are badly designed or not properly labeled. As a result, it remains unclear to people accessing the website with a screen reader what these elements represent (Asuncion et al. 2012; Leahy and Ó Broin 2009; Voykinska et al. 2016). In this regard, CAPTCHAs represent one of the biggest challenges for people with visual impairments. Usually there is no adequate non-visual alternative, which makes it impossible for them to solve CAPTCHAs and access the respective website (Asuncion et al. 2012; Leahy and Ó Broin 2009; Vicente and López 2010). Similarly, audio content is often not available in an accessible format for people with hearing impairments or deafness (Bosse and Hasebrink 2016). These barriers render visible tendencies that the needs of people with disabilities are overlooked in the creation and presentation of content, which relates to the structural conditions in the lifestyle concept.

Social and societal barriers. Relatives and caregivers often assume that people with intellectual impairments are vulnerable on the internet (e.g. Buijs et al. 2017; Chiner, Gómez-Puerta, and Cardona-Moltó 2017a). Accordingly, they perceive high risks, like being insulted, being told unpleasant things, or being excluded from a group or activity (Chiner, Gómez-Puerta, and Cardona-Moltó 2017b; Lough and Fisher 2016). A result may be overprotection, i.e. the regulation of access to the internet or to certain websites (Löfgren-Mårtenson 2008; Salmerón, Fajardo, and Gómez-Puerta 2019). Supervision during internet use can be a problem as well because it inhibits autonomous and self-determined use (Bernasconi 2007). This indicates that the right amount of support is critical and needs to be adapted individually to enable successful use of digital media (Darcy, Maxwell, and Green 2016).

Lin, Yang, and Zhang (2018) noted that information and communication technology and digital inclusion can lead to social exclusion. Some of the participants in their study, all of whom with lower limb impairments, found an escape in online activities, which led to greater isolation from social contacts in the real world. The results of a study about internet use of youths with different impairments indicate a similar problem: a great many of these youths used mostly non-social media like video games or television. Social media (such as email or chats) that could favor social inclusion played a role only for a smaller part of the participants (Mazurek et al. 2012). Macdonald and Clayton (2013) even concluded that there is no evidence that social exclusion was reduced through digital technology. Relating to the structural conditions of the lifestyle concept, these social and societal barriers deal with the position of people with disabilities in society.

Financial barriers. Costs related to the acquisition of assistive and adaptive technology as well as mobile devices are an important issue for people with disabilities (Macdonald and Clayton 2013). They are a particularly important barrier because on average people with disabilities have a lower socioeconomic status and are more likely to be unemployed (World Health Organization 2011). Harris (2010) found that the financial costs for mainstream and specialized advanced technology represented a barrier that keeps people with disabilities from fully engaging in and profiting from technological developments. In addition to hardware, costs for software and internet access necessary for full and successful use must be considered, too (Mayerle 2015). A study found that some people with disabilities opted for non-specialized, sometimes sub-optimal, solutions to reduce costs (Kane et al. 2009). The financial barriers are tied to the sociodemographic markers of an individual and hence refer to the aspect of positional characteristics in the lifestyle concept.

Individual cognitive and attitudinal barriers. In addition to the previously mentioned 'external' barriers, 'internal' barriers can hinder media use, too. This refers to cognitive barriers like the lack of knowledge about digital media (Harris 2010) as well as attitudinal barriers like the lack of confidence in skills and knowledge when using digital media (Macdonald and Clayton 2013) or fear of using technology (Vicente and López 2010). Research showed that upgrades to video games could induce anxiety and uncertainty in people with disabilities (Alper 2014). These attitudinal barriers relate to the individual characteristics in the lifestyle concept (Rosengren 1995).

Particularly people with intellectual or learning impairments cannot access online content when it is too complex (Berger et al. 2010). In a study by Palmer et al. (2012) some participants with intellectual impairments indicated that they do not use technology because of device complexity. Additionally, some people with intellectual impairments struggle with online language and conventions of the online community which prevents them from fully engaging in online communication (Caton and Chapman 2016).

Some people with disabilities prefer not using specialized devices in public because they do not want to draw attention to them (Kane et al. 2009). Non-use of assistive technology because of a feeling of not belonging was also mentioned in a Norwegian study about people with visual impairments (Söderström and Ytterhus 2010).

Interim conclusion

The literature review has shown that certain types of barriers are of particular importance to people with certain impairments, e.g. social and societal barriers are relevant mostly for people with intellectual or learning impairments, structural barriers are an issue particularly for people with visual impairments or blindness. The lifestyle concept can explain these differences accounting for the way impairment and disability affect the form of life, the way of life and ultimately the lifestyle. These different sources of influence help explain different patterns of media use.

As shown, most research about digital media use of people with disabilities is concerned either with a focus on accessibility issues or with the use of social media. Previous research has also focused to a great amount on barriers rather than benefits related to mobile technology. This study adopts a broader perspective and takes into account the everyday experiences of people with disabilities. In this way, the lifestyle concept and the structure-analytical reception research are incorporated in order to identify barriers in as well as benefits of digital media use. Accordingly, the following research questions are derived:

RQ1: What are potential 'digital' benefits that help people with visual or motoric impairments overcome obstacles in everyday life?

RQ2: What are potential 'digital' barriers in media use by people with visual or motoric impairments?

Method and design

Design and instrument

This study explores the benefits and barriers of digital media use of people with disabilities by means of qualitative interviews. A qualitative approach is preferred over a quantitative survey for three reasons: first, the literature review has revealed a great number of barriers in digital media use by people with disabilities. However, those barriers are very diverse and highly depend on the type and degree of impairment. Second, technical developments proceed rapidly and continuously reconfigure the conditions for digital media use. And third, the complex (and largely unexplored) interaction between people's unique lifestyles, ways of life, and forms of life, and everyday media use calls for a more open and in-depth analysis that resists standardization. There is also a lack of qualitative research in different areas of the interplay between disability and digital media use (Ellis and Goggin 2014; Seale and Chadwick 2017). Additionally, Foley and Ferri (2012, 192) noted that "[i]ncreasingly, the technology divide is less about access to technology and more about the deeper underlying meanings of "access".

The semi-structured interviews were organized according to an interview guide containing three deductively derived groupings of topics and questions. Based on Rosengren's lifestyle concept, a first grouping explored participants' everyday life (e.g. daily routines, social and work environment, leisure activities, etc.). A second grouping included questions on media use in general (e.g. what kind of media are used and in which situations) and with regard to specific media content (e.g. what programs, platforms, channels are preferred and why). A third grouping specifically explored experiences with barriers and useful tools for media use. This article focuses particularly on the use of digital media. All interviews were recorded (with participants' explicit consent) and later transcribed and analyzed by means of qualitative content analysis.

Participants and procedure

The interviews took place with forty people (aged between 18 and 68 years). Participants were residents of Switzerland or Luxemburg. Thirty-two of the interviewees had a visual impairment or blindness and eight a motoric impairment. The reason for the imbalance in the number of participants in the two groups of impairment is twofold: first, the pretest showed that people with light motoric impairments experience hardly any barriers in using digital media. As a result, only people with severe motoric impairments

(paraplegia or tetraplegia) were included in the study, which imposed practical limits to their recruitment. Second, visual impairments take many different forms that influence digital media use in different ways. For this reason, a higher number of participants with varying visual impairments was necessary to obtain an in-depth analysis of their diverse digital media use.

Finally, people with mental or intellectual impairments were not included for ethical reasons, since data collection was part of a research seminar and thus conducted by trained students but not experts (see Perry [2004] for a comprehensive methodological discussion). As the aim of the research seminar was to practice face-to-face interviews, inclusion of people with hearing impairments was not possible either. Moreover, hearing impairments have arguably only little impact on the use of digital media. The exclusion of these two groups nevertheless represents a weakness of the research design.

Results

Benefits of digital media use

The qualitative interviews show that people with disabilities profit from digital media in different ways. Assistive tools, and smartphones in particular, are highly valued regardless of the kind of impairment. As one participant noted, digital technology serves as an ‘all-round-tool’ that enables him to perform various tasks:

The internet has made possible a great many things that we could not do before, starting with reading the timetable [for public transportation], reading the newspaper, reading special offers of Coop, Migros, Aldi [supermarket chains in Switzerland] and so on. (male, 30 years, blind)

People with blindness or visual impairments for whom using print newspapers is difficult, can access online news media more easily with a screen reader. One participant also explained that, now, she can choose if she wants to access formerly inaccessible contents with a screen reader or read with the refreshable braille display. Digital media are an important improvement for people with partial sight because they allow adapting the presentation of content by zooming in or by adjusting the contrast. Generally, participants seem to welcome the possibilities of digital media:

Since 2000 we have been very lucky to have all these media. Before, there was only braille. (female, 68 years, partially sighted)

As noted in previous research (Ellis and Goggin 2016), GPS is a valuable tool for people with disabilities. In this study, particularly people with visual impairments or blindness make use of it, for example, when they go to a new place. For orientation, some participants use apps of public transportation services that help them read the train schedule or find the right bus.

People of both groups of impairment noted the usefulness of digital technology for shopping. While online shopping replaces the (sometimes time-consuming) trip to the store altogether, one participant with a severe motoric impairment affecting the strength in his hands also reported benefits at the store itself where he appreciates the possibility of paying through an app on his smartphone, which is easier than using cash. Another participant with a visual impairment uses an app to read the information on product packagings.

Several participants noted that digital technology improves career opportunities and work perspectives. Some could better adapt their increasingly digital working environment to their needs, others started a new job they could perform on a computer equipped with assistive technology.

As suggested by the framework of structure-analytical reception research, participants use media in various forms to solve specific problems in their everyday life. Younger participants in particular stated that online communication helps them stay in touch with friends and can compensate for their reduced mobility. One participant with blindness places Bluetooth loudspeakers on objects so that she can find them later by the sound of the music. Yet another participant with a motoric impairment uses electronic devices to operate doors, windows, lights, etc. in his apartment.

Barriers in digital media use

Throughout the interviews, participants reported experiences with both persisting and new barriers in a digital media environment:

The fact that there are more possibilities today represents progress. However, for me these [possibilities] are then reversed by different barriers. (male, 38 years, blind)

Almost all barriers elaborated in the literature overview were mentioned in the interviews. Given that all participants had visual or severe motoric impairments, barriers more specific to people with intellectual impairments hardly ever appeared in the interviews. The reported barriers can be clustered in the following sub-areas.

Technical barriers

Technical barriers concerned two areas in particular: device design and technology. The former aspect was particularly relevant for people with motoric impairments. Some of them are not able to use buttons on the side of a smartphone. Using the respective functionalities is only possible after intensive reprogramming of the smartphone. Participants of both groups of impairments mentioned that small buttons pose a problem for them because they require a higher level of motoric and/or visual capabilities to operate.

In terms of technology, regular updates of apps and websites figured as a problem for people with visual impairments or blindness. They might be able to navigate without any problem on an app or website but after an update or restructuration, they have to learn their way through the site from scratch as one participant with a visual impairment lamented:

As soon as you get used to something, it's completely restructured the next day.
(male, 37 years)

For some participants with blindness, the ubiquitous touchscreen displays represent a problem, as they cannot be operated without the assistance of a sighted person. They argue that this problem is exacerbated by the tendency of replacing accessible services provided by humans with automated machines, like in the case of ticket vending machines or ATMs. A participant with a motoric impairment noted that typing on smartphones with touchscreen is much more difficult for him than on older phones without touchscreen or on a computer. These examples illustrate how structural macro processes like the increasing automation of society can disproportionately affect people with disabilities' form of life and, in doing so, condition their media use. However, these changes are very sensitive to people's abilities and disabilities, as the case of a participant with motoric impairment affecting the strength in his hands illustrates: for him, touchscreens represent an immense improvement as their manipulation only requires minimal physical force.

Editorial barriers

Similar to previous research (Asuncion et al. 2012; Morris et al. 2016), the participants in this study, too, struggled with the architecture of certain websites. A particular problem was intricate website structures that render it impossible to spot and navigate directly to the content of interest. Instead, people with visual impairments or blindness are forced to skim the entire site with their screen reader. Advertisements, pop ups and overloaded content present additional obstacles to efficient website navigation. In line with previous research (Voykinska et al. 2016), participants using Facebook prefer the mobile version to the desktop version because its structure is less complex. Yet a general trend toward more complex structures and hence lower accessibility of websites was also mentioned in one of the interviews:

In the past, it was definitely easier. In the past, the pages were slimmer, they were not as overloaded as they are today, and the structure was simpler and easier to understand. (male, 38 years, blind)

A particularly critical aspect mentioned by most of the participants with visual impairments or blindness was the restricted selection of accessible online media content, i.e. the limited amount of content with audio

descriptions. The programming of the interface of websites and apps, too, makes some contents inaccessible when it does not allow zooming in, as one participant noted:

For example, it's not possible to zoom in on the profile picture on Instagram, and as a person with a visual impairment, you don't see anything. (female, 48years)

Certain editorial trends constitute a problem. For example, a participant with blindness struggles with videos and music that play automatically upon landing on a website thereby drowning out the voice of the screen reader. Another participant mentioned that news sites routinely upload photo galleries without any textual description. In line with previous research (Asuncion et al. 2012; Leahy and Ó Broin 2009; Voykinska et al. 2016), the lack of captions for visual content or unreliable automated captions represent a persisting issue. This editorial shortcoming of consistent and correct labeling of visual elements is consequential since people with visual impairments are found to heavily rely on and trust in automatically generated captions (MacLeod et al. 2017).

Financial barriers

The costs for specialized technology seem to be a smaller problem for the participants in this study compared to previous research (Harris 2010; Macdonald and Clayton 2013; Mayerle 2015), since in Switzerland, disability insurance in most cases covers these expenses. However, insurance usually does not cover the costs for non-specialized devices like smartphones or tablets, which prevented some participants from using them or from using the best available technology. One participant with a visual impairment explained:

I think Samsung is the best, but Apple's phones are probably the best for blind people. The problem is just that they are extremely expensive and are getting more and more expensive. (male, 37 years old)

The fact that people with disabilities must pay for these devices themselves is problematic. They are more likely to be unemployed or live in poverty (in Switzerland: Pfister et al. 2017; worldwide: World Health Organization 2011). Considering this socioeconomic situation, they often have trouble affording new technology. Ultimately, this excludes them from using and benefitting from the same technology as people without disabilities. In terms of the lifestyle concept, financial barriers represent an important influence on the way of life of people with disabilities.

Individual cognitive and attitudinal barriers

As described in the literature review, not only 'external' phenomena but also individual cognitive and attitudinal barriers hinder digital media use by people with disabilities. Interestingly, the qualitative approach of this study going beyond accessibility issues revealed several additional sub-aspects in this area.

Some participants show reluctance in their use of assistive or adaptive devices because they do not want to attract attention. One participant, for example, stated that he always turns off the screen of his smartphone so that other people on the train or bus cannot see that his screen looks different. Especially participants with partial sight avoid using the available technology whenever possible to avoid stigma. Another participant stated that he does not feel as part of the group in the same way when he uses an audio description app at the movies.

A couple of participants stated that they lack the knowledge to install and use assistive technology and sometimes they do not know anyone who could support them:

To be honest, I have a login for Twitter but I'm not quite sure how it works. I don't really understand it and for this reason I don't use it. (male, 25years old, severe motoric impairment)

A participant with a severe visual impairment, who described herself as 'no technophile', expects the use of a new device to be highly time-consuming to learn. For this reason, she does not switch from her specialized phone to a smartphone:

Well, since I have my phone, it 'talks', so I don't use [a smartphone], I don't have the time to learn it. I would have to go to Lausanne to take classes, I don't have the time. (female, 68years old)

Interestingly, some participants did not feel like they encountered technical difficulties themselves but worried that older people might lack the necessary expertise to use digital technology. This is an important aspect given that the prevalence of disability is higher in older people (in Switzerland: Bundesamt für Statistik 2019; Gärtner and Flückiger 2005; worldwide: World Health Organization 2011).

Like in previous research (Morris et al. 2016), some participants in this study, all with visual impairments or blindness, emphasized the issue of the increasing complexity of digital technology. Navigating online and on social media has become more difficult as it is demanding to keep up with the sheer endless possibilities of settings and dynamics of the online sphere, as one participant with blindness explained:

Well, I don't really use new media like social media for example, because it's too complicated and time-consuming for me at the moment, and I'm much too old for that anyway [laughs]. (male, 57years old)

This is especially relevant for privacy settings on social media, an issue that challenges people without disabilities, too (Leahy and Ó Broin 2009). As Web 2.0 technology is developing its own internal logic with emphasis on user-generated and multi-media content, connective user engagement, and personalization (Gehl 2011), the gap to the comparatively more linear

modes of offline or early online media use widens (Ellis and Kent 2011). Because the development of Web 2.0 user intuition has been largely blind to impairment, people with disabilities are relegated to 'trail those without disabilities in internet access and skills' (Dobransky and Hargittai 2016, 27).

Contrary to the greater independence acquired through digital technology, the interviews revealed that digital technology created a feeling of greater dependence. A person with a motoric impairment stated:

The smartphone makes life a lot easier for me, but at the same time, it also comes with a high level of dependence. For example, I have an app with which I can control the electronic devices in my apartment. If the phone were broken, I'd be screwed. (male, 36 years old)

Participants with visual impairments or blindness also felt this kind of dependence on technology. One participant said, she always had to ask someone for help when the screen reader on her phone does not work properly. This may be a problem given that several participants indicated that they did not like asking for help because it made them feel ashamed.

Discussion and conclusion

So far, research about disability and digital media has been rather scarce and fragmented. As emerged in the literature review, previous research was predominantly limited to issues of accessibility, its related barriers as well as the use of specific social media. This study, adopting a broader perspective, contributes an in-depth analysis and systematization of media use experiences of people with disabilities in the context of their everyday life.

The results of this study illustrate that the interplay between disability and digital media use is, in fact, complex: potentials and benefits coincide with barriers, specific problems, and new dependencies. Based on the lifestyle concept (Rosengren 1995), the study shows that specific characteristics of the interviewed groups of people with visual or motoric impairments as well as their individual needs are associated with specific benefits and barriers.

Structure-analytical reception research (Charlton and Neumann 1990) served as the basis to account for the benefits of digital media as a means of problem solving. People with severe visual impairments can access media content more easily with digital assistive technology like a screen reader or functions like zooming. Most of the interviewees, regardless of the kind of impairment, described the smartphone as an 'all-round-tool' that allows navigating through everyday life more independently; GPS and maps on the smartphones, for example, enable people with visual impairments to find (new) places. Other apps allow using public transportation services without other assistance. The possibilities of online shopping facilitate the everyday life of people of both groups because they can replace the trip to the store. Moreover, apps on the smartphone can also simplify shopping at a store,

as paying with a smartphone app obviates the arduous and often uncomfortable task of handling coins and bills. People with visual impairments can read the information on products with the respective apps. At home, some people with motoric impairments employ digital devices to operate doors, windows and lights. These results suggest that the benefits of digital media are highly individual which relates to previous findings that detect empowerment through technology for basically all people with disabilities despite varying use of devices (Darcy, Maxwell, and Green 2016). Given the sheer number of apps and possibilities, an exchange of strategies among people with disabilities and an appropriate amount of support and training tailored to their specific needs could benefit people who do not use the available tools yet.

Except for social and societal barriers, which are more specific to people with intellectual or learning impairments, all areas of barriers identified in the literature review were found in this study, too. In order to systematize these issues, they were identified according to the dimensions of the lifestyle concept (Rosengren 1995). In terms of structural conditions persisting and new technical barriers represent an important issue: people with disabilities seem to be disproportionally affected by structural macro processes like the increasing automation, exemplified by the replacement of services provided by humans through touchscreen machines. While this aspect concerned people with visual impairments, device design, like the size and placement of buttons on smartphones or remote controls, represents an issue equally important to both groups. The results of this study and previous research suggest that it is important to not only take into consideration the needs of people with disabilities when developing new technology and tools but to let them participate in the development process. The latter should strive for universal design that is accessible without additional assistive or adaptive technology to as many people as possible because '[d]esigning for accessibility always results in better, less expensive and more timely solutions than retrofits' (Barile et al. 2012, 401).

Still on the level of structural conditions, editorial barriers emerged as a central issue for people with visual impairments. Trends toward an increasing complexity and more user-generated content in the Web 2.0 environment are often not compatible with the requirements of screen readers. Advertisements, pop ups, automatically playing music or videos, lacking descriptions for visual contents, unstructured content and overloaded websites disturb access with assistive technology and impede navigation on the website. There are at least two possible underlying issues to these editorial barriers: first, it seems that content creators and designers do not sufficiently consider the needs of people with disabilities. Second, accessible and 'good' are often perceived as mutually exclusive aspects of web design, i.e. accessible web design is seen as boring and bearing little aesthetic value (Ellcessor

2014). This is equally true for the design of assistive devices (Shinohara and Wobbrock 2011). These barriers still mark a mismatch between the current state of matters and standards like the Web Content Accessibility Guidelines (World Wide Web Consortium 2008) or international conventions like the CRPD (United Nations 2006) that have been established more than 20 years ago.

Regarding positional characteristics, previous literature reported financial barriers as a central issue. This, however, was not as important for the participants in the Swiss and Luxembourgian context of this study, where expenses for assistive or specialized technology are typically part of general disability insurance. Yet people with disabilities increasingly (want to) use mainstream technology like smartphones or tablets whose costs are not covered by insurance. This is problematic given that financial support for the acquisition of a smartphone or tablet could improve the way of life of people with disabilities, even more so considering that some participants reported a feeling of unease and not-belonging or stigma when using specialized technology (in public). Failing to keep track of these developments and needs, insurance policy – even when relatively well-developed – may actually work against the technological inclusion of some people with disabilities.

The qualitative nature of this study has proven particularly fruitful to identify sub-areas of individual cognitive and attitudinal barriers, which relate to the individual characteristics of the lifestyle concept: sometimes helpful technology is not used to avoid unwanted attention or stigma. At other times, technology is not used at all or not in its most beneficial way for lack of knowledge and support. This latter issue is further exacerbated by the increasing complexity of technology and the great amount of possibilities. This is particularly the case for older people who reported the most reluctance to use newer technology because they expected its use to be too time-consuming and complicated to learn. Generally, people of both groups of impairments reported a feeling of greater dependence on technology: as soon as something does not work as usual, they feel lost and must ask for external help.

While previous research suggests that when accessibility, availability, and affordability come together, people with disabilities can successfully use digital media (Barile et al. 2012), the findings of this study show that these structural conditions and positional characteristics present necessary but not sufficient conditions for the possibility of digital media use. Instead, individual cognitive and attitudinal barriers appeared as decisive factors, i.e. the lifestyle of a user determines if digital media are, in fact, successfully used in everyday life. Similar to previous research about the adoption of digital tools (Darcy, Maxwell, and Green 2016), the appropriate support and training seem to be important factors for successful use.

The results of this study have to be interpreted considering the fact that all participants had access to the internet. This might be related to the increasing diffusion of mobile technology and the mobile phone (Ellis and Goggin 2016). The International Telecommunication Union (2019), for example, counted more than eight billion mobile phone subscriptions worldwide in 2017, with very high internet penetration rates in Western Europe. A methodological explanation is possible as well: in order to gain the most possible insight in benefits and barriers of media, participants with a rather high media use were recruited. High media use in general could in turn be associated with access to and use of digital media.

For future research, at least in the context of the Global North, it may thus be important to investigate underlying aspects of access in more detail, like the individual cognitive and attitudinal barriers identified in this study. In order to assess such factors, participant observation could prove useful to reveal aspects that remained undiscovered in available accessibility studies. Moreover, future research should include not only people with visual or motoric impairments but extend findings to other sensory as well as mental and intellectual impairments. Barriers and benefits of digital media are manifold and in constant flux, which, in this study, is exemplified in the seemingly paradoxical simultaneous development of increasing *independence through* and increasing *dependence on* digital technology. For this reason, understanding these complex and shifting dynamics remains a key task for academia and tech practitioners alike.

Disclosure statement

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