

Media Use of Persons with Disabilities

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Abstract. The study “Media use of Persons with Disabilities” (MMB16 [1]) provides data on disabled people’s access to and personal use of media and the limitations in the use of such media. Nowadays, full and effective participation in society [2] is not possible without full and effective participation in media and communication. To date, there is no valid data about media usage by the disabled in Germany.

This survey consists of interviews with 610 individuals with visual, hearing or physical impairments, or learning difficulties. Expert interviews and focus groups complete the study. The findings of this study show that impairment comes with specific limitations as regards media access and usage. In general, people with impairments and in particular those with learning difficulties, access connected devices more rarely than the general population. They go on the internet less often and use it less for communication and information. Many blind people are offliners, in particular if they acquired the impairment in adulthood. Age is an important personal factor determining media usage. The interaction of age, impairment and other context factors in particular, leads to the extremely rare use of digital media by older people. The disabled are heterogeneous. Full and equal participation in media and communication depends on the context factors which influence the participation level: age, housing, employment, obstacles and barriers to access, technical and personal support.

Keywords: Participation in media and communication · Disability · Digital divide · Media usage · Online and broadcast television · Accessibility · Assistive technologies

1 Introduction

The study “Media use of Persons with Disabilities” [1] contains data acquired from investigations conducted for the first time all over Germany on how much disabled people access and use media personally and the limitations of the media. This research was conducted by the Technical University of Dortmund, Faculty of Rehabilitation Research and the Hans-Bredow-Institute for Media Research in Hamburg.

Nowadays, full and effective participation in society [2] is not possible without full and effective participation in media and communication. The United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) cites media as a key factor for access to information and communication on an equal level and social inclusion [3]. States Parties shall take appropriate measures to ensure that people with

disabilities have access, on an equal basis with others, to information and communications, including information and communications technologies and systems [2]. This includes the mandate to collect a valid data base, statistical and research data, to enable them to formulate and implement policies to give effect to the present “Convention” [2]. There is very little basic data regarding the media-related needs of people with disabilities and the corresponding barriers to accessing media. In Germany, there are no binding obligations to avoid creating new barriers or eliminate existing barriers relating to the accessibility of private media. Since 2013 the public broadcasters have been legally obliged to offer accessible media, in particular they are required to produce subtitling (captions) and audio descriptions. But there are no targets or quotas for the provision of access to services as there are in Great Britain [4]. Due to the federal system in Germany it is the responsibility of the federal states to legislate whether the public broadcasting services have to meet the same standards of accessibility as government institutions the public administration. In the concluding observations in the initial report on Germany the UN-Committee on the Rights of Persons with Disabilities criticized the lack of binding obligations and made recommendations to “encourage public and private broadcasting bodies to evaluate their work comprehensively regarding the implementation of the right to accessibility” [5].

In their annual reports the public broadcasting services publish data on how accessible their services are. The media authorities¹ monitor the accessibility of private television channels and check the accessibility provided by the two main media groups with the biggest television audience share.

This is the first study in Germany to examine the use of media and the needs of a disabled audience. The few existing studies that deal explicitly with media and the disabled are limited to a selection of media or to particular groups. (e.g., [6–11]). As the previously mentioned MMB16 study was funded by the media authorities and the welfare organization “Aktion Mensch”, the main focus was on the use of television and audio-visual content on the internet. The test persons were asked about their personal use of the internet, radio and newspapers and access to services and devices in their households. The study therefore also provides some basic data about the use of digital media and what factors affect its access and use.

2 Research Design

In line with the “International Classification of Functioning, Disability and Health” by The World Health Organization (WHO, [12]), this study is based on the understanding that a disability is multidimensional and results from a number of interactions. How much opportunity an individual has to participate depends on the prevailing environmental, contextual and personal factors.

Disability is linked to situations. This also applies to the use of media. The deaf face limitations of accessibility to media and communication, because in Germany, not all of

¹ The 14 media authorities are in charge of licensing and controlling as well as structuring and promoting commercial radio and television in Germany.

the television programmes have subtitles or use sign language. Their socio-economic situation affects their use of media, since disabled people who cannot afford to buy the latest generation of smartphone or hybrid broadcast broadband TV (Hbb TV), cannot benefit from advanced accessibility features. People living in residential homes may also be restricted in their use of media because they have limited access to computers and no support when using one [13]. Therefore, this study takes contextual and personal factors into account, such as type of residence, age, gender, employment and education.

Henceforth, the term ‘disability’ is used when media access and usage is impeded by limitations brought about by the interaction of individuals and environmental factors. The term ‘impairment’ is used to mean limitations caused by limited body functions and structures.

As regards impairment, four subgroups facing different limitations in the use of devices and media have been identified:

- Persons with visual impairment
- Persons with hearing impairment
- Persons with physical and motor impairments
- Persons with learning difficulties

The four subgroups are heterogeneous. People who are born deaf, deal with media in a different way than people who became hard of hearing during adulthood. The blind face different obstacles and need different accessibility features than the partially-sighted. Literacy problems also influence media usage [14]. For each subgroup, a sample was created showing a variance in the context factors relevant for media use. The first step of the study was to examine which context factors were particularly relevant for the media usage of each subgroup. Besides desk research, expert interviews were conducted with 13 experts for the four subgroups and three experts for the media usage of people with impairments in general. In all the subgroups, there were experts with and without impairments. The findings helped to design the sample for the second part of the study: standardized questioning of people with impairments.

The study sought to achieve a high variance when it came to characteristics such as age, gender and education. Other factors differed depending on the subgroup:

- visual impairment (n = 154): quota for blindness and partially sighted, time of occurrence of the impairment (birth, childhood/youth, adulthood)
- hearing impairment (n = 161): quota for hard of hearing, deafened and deaf
- physical and motor impairments (n = 148): quota for time of occurrence of the impairment (birth, childhood/youth, adulthood), type of residence (private households or residential homes), variance regarding employment (regular labour market, special labour market such as sheltered workshops, and economically inactive)
- learning difficulties (n = 147): quota for reading skills², type of residence (private households and residential homes) and variance regarding employment

² The study took up the concept of “advanced reading skills”. The concept distinguishes between four levels of literacy: iconic, logographic, alphabetical and orthographical reading [15]. Alphabetical and orthographical reading are included under “reading skill” for the purposes of our study of media usage.

(regular labour market, special labour market such as sheltered workshops, and economically inactive)

It was important for each subgroup to be represented sufficiently, such that the number of cases provide meaningful results. The study aims to represent as realistic a regional distribution as possible with regard to the German federal states with a varying media landscape. This aim was met for all four subgroups.

The following Tables 1 and 2 document the types of residence and the employment situations of the sample and the subgroups.

Table 1. Composition of the sample: type of residence

	Private household		Residential home, sheltered housing groups	
	Number (n)	Share (%)	Number (n)	Share (%)
SG visual impairment	141	92	13	8
SG hearing impairment	157	98	4	2
SG physical impairment	99	67	49	33
SG learning difficulties	59	40	88	60
Total	456	75	154	25

Source: Media Use of Persons with Disability 2016 (MMB16), [1]
 Assessment by the interviewer: Respondent lives in...

We chose a disproportional representation for the quantitative survey to represent the heterogeneity of the target group with their different needs for accessibility of media and devices.

The sample includes people with impairments from the age of 14, who live in Germany and use one medium at least occasionally. In June and July 2016, 610 people were questioned by experienced and trained interviewers from the IPSOS marketing research institute. Collaboration with IPSOS meant that every interview could be conducted face-to-face using additional tools, as necessary. The questionnaire was translated into easy-to-read text. Furthermore, videos were made by a certified deaf sign language interpreter. For a better understanding, a partly illustrated booklet was designed. 23 pretests were conducted with all the target groups. By collaborating with a large institute it was possible to make suitable allowances for regional variations. The use of 101 interviewers with experience of sensitive target groups shortened the time spent on field research.

Topics covered by the questionnaire:

- Subjective perception of impairment
- Media use in general
- TV use in particular
- Specific TV-related barriers and support

Table 2. Composition of the sample: labour market

	Regular labour market		Sheltered workshops	
	Number (n)	Share (%)	Number (n)	Share (%)
SG visual impairment	42	67	20	33
SG hearing impairment	63	72	24	27
SG physical impairment	29	39	24	27
SG learning difficulties	25	22	91	78
Total	159	26	178	29

Question: Do you work ... on the regular labour market, in a sheltered workshop, in an outsourced workplace from a sheltered workshop, at a day activity center, on another basis? All respondents in employment (n = 341)

The questions used about media and TV were derived from the ARD/ZDF study “Mass Communication” [16, 17] to allow comparisons with the media usage of the general population in Germany. “Mass Communication” is a long-term study using a representative sample of 4,300 people aged 14 and over that has been carried out every 5 years since 1964 [18]. The questionnaire can be found in the annex to the final report of MMB 16 Bosse & Hasebrink 2016 (in German).

The third stage of the study dealt with focus groups with sensory impairments, their need for television, its limitations and the quality of access to German TV services. Measures were taken to ensure that all aspects relevant to the target group had been taken into account.

Studies on four focus groups with participants with different impairments were conducted:

- Blind and visually impaired people.
- Hard of hearing, deaf or deafened people, who communicate in spoken language (with speech-to-text interpretation).
- Deaf or deafened people, who communicate in sign language. The discussion was moderated by a deaf scientist.
- people with hearing and visual impairments, including deaf-blind people. The discussion was conducted in spoken language with speech-to-text interpretation.

3 Results/Findings

The main findings of the survey are presented in the following. The results of the expert interviews and focus groups are interspersed to explain or broaden the findings.

3.1 Access to Media and Devices

An important precondition for equal participation in media and communication is access to devices. New generations of digital devices like mobile media or digital

television offer potentially greater possibilities of accessibility for different kinds of impairments.

The findings of the MMB16 study indicate that access to media and communication devices is lower among people with impairments than among the general population in Germany. Compared to the results of the study “Mass Communication” there are fewer devices with access to the internet in the households of the subjects interviewed with impairments than in households in Germany in general.

There are television sets in nearly all households and no difference can be seen from German households in general. However, the TVs are devices without access to the internet. Only 12% of the households have smart TVs with access to media libraries and other online usage options. This is a remarkable fact because some of the public service broadcasters’ services in Germany are only accessible in media libraries on the internet. In particular, programmes with sign language can almost only be seen in internet media libraries. Only two news magazines with sign language are transmitted on linear television. Some special accessibility features such as adapting subtitles to individual needs (subtitle font size, position and background) are only available with Hbb TV (hybrid broadcast broadband TV)³. Such features are especially helpful to people with visual and hearing impairments.

Two thirds of the respondents own desktop computers or laptops; this is very similar to the general population. According to the “Mass Communication” study, 58% of the households possess a desktop computer and 64% a laptop [16]. There are major differences in mobile device possession. Far fewer people with impairments have access to mobile devices in their households than the general population. 45% of people with impairments own smartphones in the household and 18% own tablets. According to the “Mass Communication” study, 61% of the general public have access to smartphones in their households and 35% have access to tablets.

As shown in Table 3, age in particular, correlates with access to mobile devices. Almost double the number of respondents with impairments who were younger than 50, have access to smartphones than respondents aged 50+: 27% of the younger respondents own tablets in the household and 9% of the older respondents. The difference in relation to smart TVs is 9% points (17% to 8%). However, the younger respondents also have less access to mobile devices compared to the younger age group in the “Mass Communication” study. Comparing only respondents under the age of 30, 98% of the respondents in the “Mass Communication” study have access to smartphones but only 76% of the respondents in the MMB16 study in the same age group can access smartphones (a difference of 22% points). With regard to tablets, the difference is 23% points (54% in “Mass Communication” study and 31% MMB16). However, the low number of respondents between the ages of 14 and 29 in the MMB16 study (only 78) should be taken into account.

Differences in access to media are also shown by the type of residence (Table 3) but the difference is lower by age group. Devices with internet access are more likely in

³ Since June 2016 the Berlin and Brandenburg public broadcasting service (rbb) has offered the option of personalizing subtitles with Hbb TV. This access feature was developed as part of the EU project DTV4All [19].

Table 3. Access to media in households (age groups and type of residence)

	14–49 years (n = 294)	50+ (n = 316)	Private household (n = 456)	Residential home (n = 154)
TV (without internet access)	80	90	83	92
Radio (without internet access)	71	85	78	79
Computer/Laptop	72	54	66	53
Smartphone	61	30	49	33
Mobile phone (with internet access)	30	47	38	42
Tablet	27	9	22	7
Smart TV (with internet access)	17	8	14	8
Radio (with internet access)	9	3	6	5

Question: Do you have access in your household to the following devices?

private households than in residential homes (smartphone: 49% vs. 33%; tablet: 29% vs. 7%; desktop computer/laptop: 66% vs. 53%).

Looking closer at the subgroups of impairments, it is striking that people with learning disabilities have significantly less access to media devices than the other three subgroups (Table 4). This applies to all devices except TV without internet access. Only half of the respondents with learning difficulties have a desktop computer in the household, a third own a smartphone and one in ten owns a tablet. People with learning difficulties living in private households are slightly more likely to have access to digital media, the same applies to people younger than 50.

Access to digital devices is greatest in the subgroup with hearing impairments. Almost two thirds have access to a desktop computer or laptop and 55% to smartphones. However, compared to the general population access to digital devices is less. The respondents who are hard of hearing were on average older and are less likely to have access to digital devices than the deaf and deafened respondents.

Differences are also apparent within the subgroup of visual impairment. More blind respondents have access to audio media, i.e. radio and MP3 players, whereas partially sighted respondents more often have access to digital devices. The difference is 19% points for tablets, 15 for smart TV, 12 for desktop computer and 9 for smartphones.

Within the subgroup with physical impairments the same correlation can be seen as in the total sample. Younger respondents and respondents who live in private households are more likely to have access to digital devices than older respondents and those who live in residential homes.

Similar findings were shown in the Ofcom study “Disabled consumers’ use of communications services” in the UK, a consumers’ experience survey with 4,004 consumers with disabilities aged 15 or over and 15,859 non-disabled consumers [20]. Also in the UK “the access to communication devices and services in the home was

Table 4. Access to media in households (subgroups of impairments)

	SG visual impairment (n = 154)	SG hearing impairment (n = 161)	SG physical impairment (n = 148)	SG learning difficulties (n = 154)
TV (without internet access)	81	82	85	93
Radio (without internet access)	86	67	86	75
Computer/Laptop	61	74	68	47
Smartphone	46	55	45	34
Mobile phone (with internet access)	44	44	42	40
Tablet	21	22	17	10
Smart TV (with internet access)	14	14	15	5
Radio (with internet access)	8	8	6	3

Question: Do you have access in your household to the following devices?

generally lower among consumers with disabilities than among those without” [20]. The results showed a correlation between age, socio-economic situation and access to connected devices, both for non-disabled and disabled consumers. But access to these devices was lower among disabled consumers in the same socio-economic group than among non-disabled consumers. The gap widened further among the consumers with a lower income and among older consumers [20].

The Ofcom study also showed the impact of employment. There were very few differences in the level of access to media devices between disabled and non-disabled consumers in employment [20]. The German study MMB16 produced a similar result. People who are employed and in education or training are more likely to have access to a computer, smartphone or tablet (desktop computer: 68% in education, 72% employed, 50% economically inactive; smartphone: 79% in education, 54% employed, 25% economically inactive). However, there is a correlation between age and employment, education or being economical inactive. A further distinction was made between the regular labour market and the special labour market, such as sheltered workshops. Significantly more respondents who work in the regular labour market (n = 159) have access to connected devices, than respondents who work in sheltered workshops (n = 178): desktop computer: 79% regular labour market, 65% sheltered workshops; smartphone: 74% regular labour market, 37% sheltered workshops; tablet: 33% regular labour market, 8% sheltered workshops; smart TV: 22% regular labour market, 6% sheltered workshops.

3.2 Use of Daily Media in General

Television is by far the most used daily medium and this is the case for all age groups and all groups of impairments (Table 5). In all subgroups, the respondents watch TV more frequently than the general population (88% at least several times a week). This is particularly the case for the older respondents 50+ as well as people with learning difficulties and those with physical impairments. The lowest percentage of regular television viewers are the blind (79%) and the deaf respondents (77%). This may be due to the comparatively low number of programmes with audio description or sign language on German television.

There is above-average radio usage by respondents in the subgroups with visual and physical impairment. In these subgroups, more respondents regularly listen to the radio than the population in general. For obvious reasons the percentage of radio listeners is low in the subgroup with hearing impairments. Nevertheless, 80% of the respondents who are hard of hearing regularly listen to the radio.

Fewer people with impairments read newspapers at least several times a week than among the general population in Germany. Older respondents are more likely to read newspapers than younger respondents. There is a big difference between people working in the regular labour market or in sheltered workshops. 65% of the respondents in the regular labour market and 29% of the respondents in sheltered workshops read newspapers regularly. There are more newspaper readers among the respondents with hearing impairments than among the general population (most of the older people who are hard of hearing). Also, disproportionately more older people with physical impairments read newspapers regularly. Not even half of the respondents with visual impairments read newspapers regularly. Almost half of the blind respondents never read newspapers. A reason for the low level of newspaper readers may be that there is a low supply of accessible newspapers for blind people. In Germany, digital editions of daily newspapers are mainly not accessible to the disabled, according to the experts.

Only one of five respondents with learning difficulties reads a newspaper at least several times a week. As expected, reading skills influence newspaper use. A third of the respondents of this subgroup with reading skills read the newspaper regularly. There are also correlations between the newspaper use and the type of residence, employment and age. People with learning difficulties are more likely to read newspapers when they live in private households or work in the regular labour market. The correlation between age and reading newspapers is the opposite of other subgroups. More young respondents with learning difficulties regularly read newspapers than older respondents (50+). This result is linked to reading skills, because only a third of the older respondents with learning difficulties have reading skills, compared to 70% of the younger respondents.

The Internet

Internet usage is strongly influenced by age. Fewer older participants use the internet regularly than younger participants. 52% of the respondents who are 50 and older, and 77% of the respondents under 50 use the internet at least several times a week.

Table 5. Personal use of media at least once a week (data in percent)

	Mass communication 2015*	MMB16 total sample		SG visual impairment		SG hearing impairment		SG physical impairment		SG learning difficulties	
		14+ (n = 4300)	14-49 (n = 294)	50+ (n = 316)	14-49 (n = 66)	50+ (n = 88)	14-49 (n = 79)	50+ (n = 82)	14-49 (n = 73)	50+ (n = 75)	14-49 (n = 76)
Radio	82	65	81	91	92	18	65	85	88	74	79
TV	88	90	94	82	88	86	94	99	97	93	99
Newspaper	60	45	57	42	52	71	90	40	67	24	15
Internet	71	77	52	80	48	95	61	81	52	51	45

Question: With regard to the radio, TV, newspapers and the internet: Regardless of the time you spend using each, I would like to know how often you use the different media: several times a day, once a day, 2 to 3 times a week, once a week, 2 to 3 times a month, once a month, less or never.

*Data of the long-term study Mass Communication [16].

The type of impairment also influences internet usage. In particular, fewer people with learning difficulties and blind people access the internet regularly. Fewer than every second respondent with learning difficulties goes on the internet at least several times a week. Reading skills and working conditions have an impact on the internet usage of this group. More participants with learning difficulties use the internet when working in the regular labour market and if they possess reading skills. People with learning difficulties differ from the other groups also in the variety and type of the internet activities. There are only five activities which more than 50% of the participants with learning difficulties carry out. First of all, they use video portals like YouTube followed by search engines, surfing, radio/music and online communities. Only one in three respondents looks for news on the internet. In the other groups, more people communicate via internet and social media, look for news or shop online. Only 16% of the respondents with learning difficulties use the internet for online shopping.

Two thirds of the respondents with visual impairments regularly use the internet and the other third never uses the internet. Many blind people in particular are offliners. 43% never go on the internet (Table 6). The time when the visual impairment first occurred influences internet usage. People born with a visual impairment use the internet more often and follow a broader range of activities than people who acquired the impairment in adulthood. (But the small number of cases sampled should be taken into account.) Nearly half of the visually impaired who acquired the impairment in adulthood are offliners (Table 6). Regarding the variety and type of activities on the internet, the respondents with visual impairments act in a more limited way than other groups. Search engines are only used by 77%, followed by news (54%), online shopping (52%) and surfing (50%). Only 42% communicate via internet and social media. This is the lowest percentage of all groups. Looking only at the blind respondents the share drops to 27%.

Inaccessible websites and apps are not the only barriers to internet use for the visually impaired and the blind in particular, as the experts state. Obstacles and barriers make it difficult to surf the internet and require a certain degree of technical understanding. Due to the rapid development of online applications, screen readers can

hardly keep up with the development and users need to always have the latest version, otherwise blind users are excluded from many pages and applications. The rapid growth of audio-visual content on the internet, especially in social media, excludes visually impaired users, at least temporarily, from internet applications. These difficulties and barriers may be deterrents in particular for people who acquire the impairment in adulthood and have to learn new techniques and strategies at an advanced age.

The majority of the visually impaired respondents use a desktop computer for the internet, only 39% use a smartphone (32% in the case of the blind) and 20% tablets (12% of the blind). The relatively low percentage for mobile devices may be surprising, because they have advanced functions for easier usage. The earlier the respondents acquired the impairment the more they use mobile devices to access the internet. The experts found differences in the use of mobile devices with universal design features and computers with assisted technologies for the blind. Which device and technology a person chooses may be a question of age but also of technical expertise. Our findings give a clear picture. The majority of blind respondents use computers and only one in three uses mobile devices (68% vs. 32%). This may change with time but younger blind respondents under 50 also use a desktop computer more often (65%) than smartphones (41%) or tablets (12%).

Table 6. Percentage of Offliners who never use the internet

	Offliners* (%)
Sample (n = 610)	27
Age 14–14 years (n = 294)	14
Age 50 and older (n = 316)	39
All respondents with visual impairments (blind/visual impairment) (n = 154)	33
– Only blind respondents (n = 61)	43
– Born with visual impairments (n = 29)	10
– Acquired visual impairments in adulthood (n = 81)	49
All respondents with hearing impairments (n = 161)	19
All respondents with physical impairments (n = 148)	27
All respondents with learning difficulties (n = 147)	29
– Learning difficulties with reading skills (n = 75)	25
– Learning difficulties without reading skills (n = 72)	33

Question: With regard to the radio, TV, newspapers and the internet: Regardless of the time you spend on the internet, I would like to know how often you use the different media: several times a day, once a day, 2 to 3 times a week, once a week, 2 to 3 times a month, once a month, less or never

*Offliners = respondents who never use the internet

People with hearing impairments have an above-average use of the internet. 95% of the respondents younger than 50 years and 61% of the older respondents use the internet regularly. The differences between the deaf, deafened and the hard of hearing are related to age difference. The hard of hearing participants are much older than the deaf and deafened. The variety of activities is broader than in the other groups and the participants use more different devices to access the internet. Nearly three quarters of the respondents with hearing impairments search for daily news on the internet and use online communities, e-mail or instant messaging to communicate with others (88% younger respondents; 60% older). These findings reinforce the statements of the experts, who consider the internet to be a “revolution” for communication and information options for people with hearing impairment, especially the deaf and deafened.

69% of the respondents with physical impairments use the internet regularly; much younger than older participants. There is also a difference between people who live in private households or in residential homes. 74% of those living in private households and 60% of those in residential homes use the internet at least several times a week. It is to be noted that fewer people with learning difficulties living in care homes (48%) use the internet than people with physical impairments. (But the small sample should be taken into account, i.e. 49 people with physical impairments and 88 people with learning difficulties living in residential homes.) The variety of activities is broader than in the groups with visual impairments or with learning difficulties. More than 70% use search engines, online communities, e-mail or instant messaging, news sites or surf on the internet. About half of the respondents with physical impairments use a desktop computer, laptop or smartphones to access the internet and 21% use tablets.

Television – Preferences, Needs and Barriers

The focus of the study was on television, the usage and limitations on the usage. Television is the most widespread and the most used medium across all subgroups of impairments and age. There is only one exception, i.e. more blind respondents use radio more regularly than television. The percentage of regular users is slightly lower among blind and deaf persons than in other subgroups, i.e. 79% of the blind and 77% of the deaf respondents watch television at least several times a week. 18% of the blind and 13% of the deaf never watch TV. This points to another finding of the study, i.e. that blind and deaf people face greater limitations to their use of television than other subgroups.

Further evidence of the importance of television for media users with disabilities in Germany is shown by the motives they give for watching television. Pleasure, information and relaxation are the most frequent motives, followed by “*getting useful information for daily life*”, watching television by habit and “*having a say in things*”. In comparison to the general population, more respondents with impairments agree with these different motives. It would therefore seem that television has a higher functional significance for people with impairments than for the general population [1].

These findings mainly apply to linear television watched on “conventional” TVs without internet access. Online television is relatively insignificant. As indicated above, the respondents rarely have access to internet TVs in their households and only 11%–12% watch television on their desktop computers or laptops. Less than a third of the respondents use these devices to watch videos or television online. Of the younger

participants under the age of 50, 38% watch videos or television online [1]. In comparison, 53% of the general population in Germany watch videos on the internet at least once a week [17]. These findings emphasize the necessity of incorporating accessibility features in German linear television. If subtitles, audio descriptions and sign language are only provided online, the majority of disabled media users will not be able to use them. Online television usage may rise in years to come but the lack of suitable digital devices and media habits should not be underestimated. The Ofcom study “Disabled consumers’ use of communications service” in Great Britain in 2015 showed similar results, i.e. the disabled consumers were more likely to have access to free-to-air TV than non-disabled consumers and less likely to have access to Pay TV. “Access to devices and services was generally lower among those with disabilities than among non-disabled consumers” [20].

The results of the sensory impairment focus groups underlined the findings. The participants urgently requested accessible programmes on linear TV. It would seem that for a great majority of the respondents equal media participation means having accessible programmes on linear TV.

A large number of those sampled use assistive technologies or means when watching TV at least sometimes. Assistive technologies and means include audio descriptions, subtitles, sign language, easy-to-read captions, FM systems, sound processors or personal support. 58% of the younger respondents and 51% of the older respondents use at least one of these means at least sometimes to watch TV. Whether a television programme is accessible or not influences the programme choices of two thirds of the sample.

Of course, the needs and barriers depend on the impairments but over all groups, many respondents have problems with poor speech quality. Ambient noise, loud music or slurred speech limit many respondents in their use of television. Clean audio could be a solution for this problem. Remote control handling is also a frequent problem, not only for people with physical impairment but also for people with visual impairment, in particular the blind persons and those with learning difficulties. Bigger and easy-to-feel buttons on the remote control, voice output and a longer time slot to select the channels are the most wanted improvements.

These are the findings regarding the needs and barriers for the different impairments:

Vision: Most respondents requested more audio descriptions and better speech intelligibility. More blind respondents reported problems with speech intelligibility than partially sighted respondents. Partially sighted participants of the focus groups mentioned the lack of textual information on the screen as a limitation. Inserts and graphics with written information often appear on the screen without being read out. The respondents required audio descriptions for more broadcasting formats, such as live broadcasts of sporting events or shows, feature films, television magazines, documentaries and news. A quarter of the respondents have problems using the remote control, which is the highest proportion of all subgroups.

Hearing: For the impaired hearing subgroup, television accessibility means better speech intelligibility and sound quality, subtitles and more sign language on linear television. The enormous importance of accessibility is clearly shown by the fact that for nearly 90% of the respondents (n = 84) programme accessibility is a

decision-making criterion as to what to watch on TV. More respondents than in other subgroups reported problems following TV programmes due to lack of accessibility. The most disabled subgroup is the deafened. Subtitles are equally important for the hard of hearing, deafened and deaf and subtitles should be available for 100% of broadcasting but German television, in particular the private broadcasting channels, are far from this state. Sign language is used by 94% of the deaf and 85% of the deafened respondents. They ask for a wider range of broadcasting formats with sign language, above all news programmes, documentaries, entertainment shows and sport. The focus groups stressed the need for sign language in children's programmes. Sign language should not be "hidden" in media libraries on the internet but provided in "conventional" linear programmes.

Dexterity: Limitations mainly occur with the remote control. Bigger, easy-to-feel buttons on the remote control and a longer time slot to select the channels would help. Respondents who sometimes have problems following programmes report that better speech intelligibility and easy-to-read captions would be helpful.

Learning difficulties: As expected, improved accessibility of audio-visual content by using sign language, subtitles and audio descriptions is less important for this subgroup. Easy-to-read and better speech intelligibility would be useful. The biggest problem is remote control handling. Except for the blind respondents, no other group had more respondents experiencing problems using the remote control. The respondents require easy-to-feel buttons on the remote control, voice output and suitable applications for smartphones and tablets.

3.3 A Growing Group: People with Visual and Hearing Problems

Thanks to the expert interviews, we were able to carry out a special statistical analysis of people with both visual and hearing problems. For this reason, we added two questions regarding visual and hearing problems⁴ to identify respondents with both impairments. Every sixth respondent reported visual and hearing problems. Older persons especially, have visual and hearing problems additional to their main impairment. Two thirds of the respondents over 60 reported problems with both senses (Table 7).

This group faces special limitations in media usage. Compared to all respondents older than 60, this subgroup rarely reads newspapers but uses the internet slightly more frequently. Depending on the specific form of impairment, they have different needs regarding the accessibility of audio-visual content. Better speech intelligibility and easy-to-read captions are very important to the majority of the respondents. The focus group reported that slurred speech, people speaking simultaneously, ambient noise and loud music were the main problems. As regards subtitles, the focus groups participants referred to the legibility of subtitles, the frequent problems being poor background contrast and not enough time to read the subtitles [1].

⁴ The questions were taken from the study "Gesundheit in Deutschland aktuell" (GEDA), a representative survey about the state of health in Germany [21].

Table 7. Respondents with visual and hearing problems

	Number (n)	Share (%)
Women	55	56
Men	43	44
14 to 39	8	8
40 to 59	26	27
60 and older	64	65
SG Visual impairments	24	25
SG Hearing impairments	30	31
SG Physical impairments	24	25
SG Learning difficulties	20	20

Source: Media Use of Persons with Disability 2016 (MMB16) [1].

Questions: Are you able to recognize a person's face from a distance of 4 m, e.g. on the other side of the road? Are you able to follow a conversation with several people? Answers: Yes, with no difficulty; Yes, with a little difficulty; No, with great difficulty; No, not at all.

Basis: Respondents with visual and hearing impairment (n = 98), who answered both questions yes, with a little difficulty or no, with great difficulties or no, not at all)

4 Conclusion

The MMB16 study is a first step towards collecting data on the participation and inclusion of people with disabilities in media and communication in Germany. It shows that impairment is accompanied by specific limitations to media access and usage. People with disability are as heterogeneous as the subgroups themselves and full and equal participation in media and communication depends on the context factors which influence the level and degree of participation, i.e. age, housing, employment, obstacles and barriers to access, technical and personal support. Considering this diversity, the approach chosen to describe different subgroups does not completely meet the many different forms of individual media use.

Age is an important personal factor shaping media usage and is also shown by general media usage studies. It would seem that the interaction of age, impairment and other context factors leads to the particularly rare use of digital media by older people with impairments.

Living and working in care homes and workshops for persons with disabilities does not mean that the individuals there are given any particular help accessing digital media. Indeed, the findings of the MMB16 study indicate a negative correlation between living in residential homes or working in sheltered workshops and digital media access and usage. Welfare associations should pay closer attention to digital participation.

The internet plays a major role in equal participation in media and communication. In general, people with impairments, but in particular those with intellectual impairments, are less likely to have access to connected devices than the general population, use the internet more infrequently and use it less for communication and information. The MMB16 study confirms the results of other studies in other countries [14]. Many blind people are offliners, even more so if they acquired the impairment in adulthood. Obstacles and barriers to access and the rapid growth of audio-visual content are further limitations to internet access.

Television plays a major role in the media resources of persons with impairments. More persons with a disability regularly watch TV compared to the general population in Germany. Therefore access service obligations are important for an equal participation in media. “Digital and online television could potentially offer greater access for persons with disabilities, particularly those with vision, hearing and physical impairments (Ellis 2012; Robare 2011; Slater, et al. 2010); however, this is far from automatic” [22]. Broadcasters must be obliged to provide accessibility options. In Germany, there are only loose agreements with public and non-public broadcasters. Furthermore, the findings of our study point to the problem that new technological solutions to improve accessibility require persons with disabilities to buy the latest generation of devices themselves. Due to different factors such as age, low income or unfavourable living conditions they often have no little or no access to the latest technology.

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