Caregivers' Influence on Smartphone Usage of People with Cognitive Disabilities: An Explorative Case Study in Germany

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Abstract. Intuitive handling, mobile internet access, and a large number of applications make smartphones extremely popular devices. Smartphones promise particularly high potentials for various marginalized groups. This explorative case study examines formal caregivers' attitudes towards smartphone usage and internet access by people with cognitive disabilities. Due to the close relationship to their clients, it is assumed that caregivers support or prevent smartphone usage of people with cognitive disabilities depending on their attitudes and experiences. The aim of this study is to examine which particular factors influence caregiver's attitudes towards smartphone usage. Twenty-four semi-structured interviews with formal caregivers were conducted between January and December 2018 in Germany. This paper discusses the main findings on the background of psychological and technological theories of technology acceptance and personal-growth, including self-determination-theory.

Keywords: Smartphone-usage · People with cognitive disabilities · Caregiver's influence

1 Introduction

Smartphones are extremely popular devices in Germany. In the last five years, smartphone usage among people aged fourteen and more, increased by 34% [1]. Germany is considered as one of the leading four countries regarding to smartphone penetration [2]. Smartphone usage increased rapidly not only in Germany, but also worldwide [2–5]. Internet and smartphone usage are strongly connected [1]. The most common smartphone activities can be grouped into four categories: Communication, entertainment, information research, and facilitation of daily activities [2]. This study focuses on online-based activities of smartphone usage in those four categories.

Not all people have equal opportunities to use smartphones and access the internet, a phenomenon often labeled as "digital divide" [6–8]. These divides depend on income,

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education, age, gender, media literacy or disabilities, among others [6–8]. The Convention on the Rights of Persons with Disabilities (UNCRPD), which was ratified by 177 states including Germany, emphasizes the importance of internet access and participation in a digital society for people with disabilities [9]. Especially people with cognitive disabilities are affected by insufficient internet access and reduced smartphone usage. The resulting disadvantages regarding social participation are manifold and encompass information acquisition, internet communication, dating, and many other aspects of daily living [10–13]. Living situations of people with cognitive disabilities are characterized by strong bonds between these individuals and their caregivers, but also a certain imbalance in power [13]. Therefore, we assume that caregivers' attitudes are affecting smartphone usage of people with cognitive disabilities. This study aims to find out about caregivers' attitudes towards smartphone usage of people with cognitive disabilities.

1.1 Smartphone-Usage and Acceptance in Society

Smartphones are important tools to enhance participation and quality of life; they are easy to use, offer various opportunities of personalization to individual needs [10, 11].

Besides these advantages, phrases like "phubbing" [14] or "nomophobia" [15] signal negative impacts of excessive smartphone usage. Addiction to smartphone usage is a common problem among adults worldwide: "It manifests itself in the excessive usage of their phones, while engaged in other activities such as studying, driving, social gatherings and even sleeping" [16]. Some recent studies also examine links between smartphone usage and negative emotional states such as stress or depression [16, 17].

The great appeal of smartphones becomes visible by people camping hours before official store openings, in order to be among the first people purchasing new models [18, 19]. However, what motivates people to do so? What makes smartphones so popular? One the one hand, some answers can be found in the smartphone characteristics described above [10, 11]. On the other hand, empirically well-tested psychological models such as the Theory of Reasoned Action (TRA) [20] and the Theory of Planned Behavior (TPB) [21], as well as technology acceptance models such as the Technology Acceptance Model 3 (TAM 3) [22] and the Cognitive Affective Normative Model (CAN Model) [23], suggest further aspects related to their popularity. Figure 2 summarizes relevant technology acceptance factors from these models. Yellow main factors are derived from TAM3, while the factor emotions (orange box) is adapted from the CAN Model. "Perceived behavioral control" originates from the TPB. Five surrounding factors are also depicted, which affect the main factors. Main factors and surrounding factors influence individuals' attitudes towards technologies, which affect intentions for technology adoption and use behavior. This integrative view on technology adoption serves as heuristic for the subsequent discussions and analyses of caregivers' attitudes towards smartphone usage.

Based on the TAM3 [22], **perceived usefulness** and **perceived ease of use** are two important main factors that influence adoption and usage behavior [22]. In view of the large amount of features that are operated used through are and touch screen interface, these factors seem particularly relevant for smartphones. The CAN-Model proposes positive and negative **emotions** as important factors influencing usage behavior [23].

People feel positive emotions when being part of social networks or in when communicating via messenger apps to the extent that these activities satisfy their needs for affiliation. Personal assessment of own competences and **perceived behavioral control** are included as main factors in TRA [20] and TRB [21]. Both impact the way people interact with technologies. Positive self-evaluation, based on positive experiences and confirmation of competences, foster usage intentions [20, 21]. As depicted in Fig. 1, other factors such as perceived job relevance, social influence, impacts on images and facilitating conditions [20–23], in turn, affect these main factors. To give an example, Venkatesh and Bala [22] show the importance of experiences and opportunities for testing out new technologies as relevant factors affecting positive or negative emotions. Similarly, social influences, facilitating conditions or perceived relevance can have a positive or negative impact on the main factors, which in turn effects the attitude. On the basis of these factors, people form an opinion which could lead to actual use or rejection of the technology. Hastall, Dockweiler and Mühlhaus [24] describe user acceptance as a dynamic process consisting of distinct phases, which could start with "not being aware of an innovation" (stage 1) and end with "sustained use" (stage 6) or "stopped use" of a technology (stage 7). Stage models like this emphasize the dynamic character of the technology adoption process and are valuable for distinguishing individuals based on their current stage and for developing stage-dependent interventions.

1.2 Caregivers' Influence on Smartphone Usage of People with Disabilities

In Germany, living situations of people with cognitive disabilities are characterized by different grades of control through caregivers. Most people with cognitive disabilities live in residential homes. These settings are characterized by high levels of caregiver control, which result in restricted self-determination and independence of people with cognitive disabilities [25, 10]. A smaller percentage of people with cognitive disabilities are living in so-called outpatient living settings. People with cognitive disabilities in these settings enjoy a larger degree of independence, as they live largely self-determined in their own apartments. Caregivers provide hourly support and assist people with cognitive disabilities in many aspects of daily living [25, 26].

Haage and Bosse [26] observed an association between living in residential homes and digital media access and usage: "Living in care homes […] does not mean that the individuals there are given any particular help accessing digital media" [26]. In their representative survey of 610 persons with disabilities, 147 persons with cognitive disabilities were asked about their media usage and living situation. Sixty percent of persons with learning disabilities were living in residential homes. Compared to the other groups of persons with disabilities, this group showed the smallest percentage of smartphone access (34%) [26]. A similar result was reported by Zaynel [27], who found out that caregiver's attitudes, social influences and living situations are the most important factors for internet usage of young people with Down Syndrome. Living situations that are characterized by a greater level of control are intended to provide intensive support and a safe living condition particularly for people with more severe

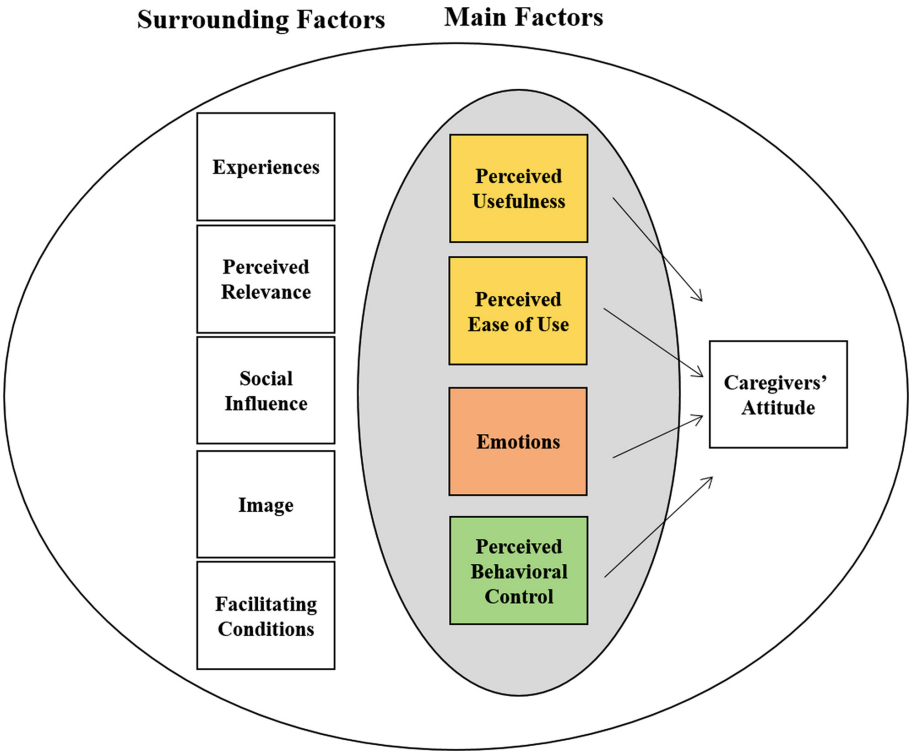

Fig. 1. Factors influencing technology adoption [own figure, based on 20, 21, 22, 23]

forms of cognitive impairment. Hence, caregivers are in a conflicting situation between providing the needed support without restricting to much the autonomy of vulnerable individuals [29–35].

Ideally, the bond between caregivers and people with cognitive disabilities is very close and strong [33]. Often, this implies reduced levels of self-determination and independence for people with cognitive disabilities. This also applies to the usage of new media and technologies like smartphone devices and the internet [29, 30]. People with cognitive disabilities try to "escape the control of the surrounding world. Without having to ask permission, they are all by themselves, capable of deciding which sites they want to visit and with whom they want to communicate. […] they want to be like everyone else" [30]. Löfgren-Marterson [30] found out that people with cognitive disabilities are using the internet to socialize with others "beyond the control of staff and family members". They feel free to organize, plan and decide by themselves how to arrange meetings. Overall, the more institutionalized facilities are, the stronger they are characterized by heteronomy [29]. Molin [29] emphasizes the importance of caregivers' support for introducing digital media to people with cognitive disabilities: "[P]eople with cognitive disabilities need help in understanding the nature of new apps and pages". Provided support is closely linked to caregivers' levels of skills and familiarity in using new technologies [32, 33]. Similar findings were observed in other

care contexts. Parents, for example, often tend to create a special and safe environment for their children and expect others (e.g. agencies or agencies) to do the same [29, 35]. Teachers, as another example, often take over responsibility to protect pupils against bullying or other dangerous situations [29].

Overall, several research gaps regarding the use of modern technologies and digital media by people with cognitive disabilities can be identified [29, 30]. The above described acceptance factors proposed by TAM3, TRA, TRB and CAN-Model are empirically well-tested for general populations. Yet, little is known about caregivers' influence on smartphone usage of people with cognitive disabilities [33–35]. In order to enhance digital participation for this group, research is needed to examine the extent to which these factors are also applicable to such care settings. The current study thus aims to extend the knowledge about caregivers' attitudes towards internet and smartphone usage of people with cognitive disabilities. It focuses on differences between caregivers working in residential homes and those assisting in outpatient living contexts. The study attempts to answer the following two research questions: (1) Which factors influence caregivers' attitudes towards smartphone usage of people with cognitive disabilities in a positive or negative way? (2) To what extent are caregivers' attitudes towards smartphone usage of people with cognitive disabilities dependent on those individuals' living situations?

2 Sample and Methodology

For answering the research questions, 24 semi-structured interviews with caregivers were conducted between January and December 2018. The sample consists of formal caregivers who work in institutions for people with cognitive disabilities in the state Northrine-Westphalia in Germany.

As described in Sect. 1.2, gown-up people with cognitive disabilities in Germany usually live either in residential institutions or in outpatient living contexts. Mirroring this distinction, eight interviewed caregivers (six males, two females) were working in residential homes which are characterized by a high degree of caregiver control. Five caregivers (four females, one male) were working in outpatient living situations, which are characterized by a smaller degree of caregiver control. Additionally, twelve experts (six females, six males) with management responsibilities working in different areas of social welfare were interviewed. All of them work with the target group of this study, but are not directly involved in their daily care. The purpose for conducting these additional interviews was to gain deeper insights into the complexity of caregiver influences from different perspectives.

All caregivers were interviewed using the same interview guide. Participation in this research was voluntary. Caregivers were informed about the interview recording and aims of the study. The interview was structured in four parts. First, caregivers were asked about their function and role in their particular institution. Second, questions about general attitudes towards digitalization and own usage of digital technologies were asked. Third, the main part of the interview guide included questions about the digital infrastructure of their institutions and their attitudes towards the use of digital technologies of their clients. Fourth, respondents were invited to give their personal

outlook to the future of digital media use in care settings. The recorded interviews were fully transcribed following the transcription guidelines by Dresing and Pehl [37]. The same evaluation process has been applied to all interviews: During an open coding process of transcripts [38–40], a total number of 35 codes was identified. Following guidelines for axial coding [40], codes were analyzed, rejected or joined together. As a result, ten main codes and 43 subcodes (see Table 1) were identified. Sub codes are divided into two levels. Table 1 shows all identified main categories as well as exemplarily differentiations into sub codes for the categories "internet usage of people with cognitive disabilities", "disability characteristics", and "digital infrastructure". The current analysis is restricted to these three main categories, which emerged as most important categories. Interrelationships between different codes were determined following principles of selective coding [39, 40].

Table 1. Identified results of content analysis (own table)

Main topic	Subtopic level 1	Subtopic level 2
Internet usage of people with cognitive disabilities	- Opportunities - Risks - Suspected problems - Occurred problems	Opportunities: • Autonomy • Communication • Relationships Risks: • Data protection • Liability
Disability characteristics	- Cognitive abilities - Living situation - Income situation - Reading ability - Legal guardians	
Digital infrastructure	- Wireless LAN - Barriers - Implementation - Missing usage opportunities	Barriers: • Data protection • Liability • Access • Costs

3 Results

This discussion focuses on the three main categories "disability characteristics," "digital infrastructure" and "experiences". It is immediately evident that opportunities, support and experiences with smartphones and internet usage differ within the target group of people with cognitive disabilities. These differences can be connected to the degree of (a) institutionalization and (b) caregiver's attitudes. The result discussion below is therefore separated for these two aspects. All quotations from interviewed caregivers in this section were translated from German into English.

3.1 Characteristics of Individuals with a Disability

Caregivers mentioned characteristics of their clients such as income, living situation and cognitive abilities as important factors for their attitudes towards clients' smartphone and internet usage.

Income Situation
Many caregivers indicated barriers originating from the low income of people with cognitive disabilities. Although smartphones are described as highly popular among people with cognitive disabilities, caregivers' attitudes towards the purchase of smartphone devices are rather negative, because clients often do not possess enough money to afford them or their usage. One caregiver stated: "[S]martphones are expensive. Clients do have a maximum of 112 € pocket money per month. Maybe some of them are earning some extra money and get 150 € additional". Furthermore, not only a smartphone is needed, but also infrastructure like wireless LAN, which is often not available (see Sect. 3.2) and could lead to additional cost and efforts for institutions. These results are independent from grade of institutionalization. Low income situations are perceived as general problem that affects basically all people with cognitive disabilities.

Living Situation
Most of the people with cognitive disabilities are spending their whole life in residential institutions with high levels of caregiver control. The interviewed caregivers in those setting stated that people with cognitive disabilities are not particularly interested in using the internet. Yet, this is mainly a function of the age group of individuals living in those settings. As seen in the general population [1], internet usage decreases with higher age. As one caregiver notes: "We have 50 years as average age of residents in our institution. When they were young, they had no contact to digitalization. Therefore, they are not interested in these topics, like every other person over a certain age". Furthermore, it was mentioned that people with cognitive disabilities are satisfied with their offline activities and therefore have no desire to expand their activities into the online world. For this reason, caregivers' support in accessing new media and technologies in those settings was limited. Other tasks such as care assistance or hygiene measures were focused here. Moreover, the available digital infrastructure in many residential living situations did not provide opportunities – even for caregivers – for accessing the internet (Sect. 3.2).

In outpatient living situations, in contrast, caregivers did not see major differences to the general population regarding internet usage and smartphone ownership. People with cognitive disabilities in those settings were reported to use their smartphones mainly for communication, social media consumption, and other tasks of daily living (see Sect. 3.3 for details). All interviewed caregivers stated that all of their clients own a smartphone. The caregivers were even equipped with smartphones to assist their daily work, and reported intensive communication with their clients via messenger tools such as WhatsApp, which included information about upcoming visits or brief discussions.

Cognitive Abilities
Caregivers working in residential institutions argued that persons – due to their extent of cognitive impairments and missing reading abilities – do not sufficiently understand

"how things in the online world work". Cognitive abilities to understand and to read texts were often mentioned as important preconditions for using smartphones and the internet. The handling of prepaid cards for mobile internet access was a frequently stated issue. People with cognitive disabilities have problems to understand how prepaid card works and what needs to be done if no credit is left. Privacy issues when using social network applications like Facebook, Instagram, Snapchat or WhatsApp, and generally low media competencies, are frequently mentioned barriers. While most people in less institutionalized living situations owned a smartphone and used the internet, the opposite is true for people in more institutionalized living situations. Phones without an internet connection are more widespread in the latter context, but still not available for all individuals. This confirms the assumption of a digital disability divide within the target group depending on their living situation. The interviews of carers working in less institutionalized settings suggest that people with cognitive disabilities are capable of using smartphones and accessing the internet. Smartphones thus generally appear as suitable devices for easy access and usage, and some functions can compensate, to some extent, cognitive deficits (e.g., voice input or read-aloud functions). Thus, cognitive abilities might not be the critical limiting factor, as caregivers' attitudes and influences seem to be an even more important factor.

3.2 Digital Infrastructure

Results indicate that four constellations should be distinguished regarding the role of internet access in the care environments: (1) Limited access for employees, but no access for residents, (2) full access for employees, but no access for residents, (3) access for residents under caregivers' control, and (4) self-determined internet usage.

Low Technical Infrastructure

The first scenario is characterized by a low-level technical infrastructure, with no internet access for people with disabilities but limited access for employees. One caregiver reported that a whole team has to share one computer with slow internet access for documentation. Older institutions were often built far away from city centers: "We only have good internet access if the weather is good," one caregiver stated. In this scenario, both clients and caregiver have problems accessing the internet. Caregivers document their activities primarily via paper-and-pencil, and have limited access to digital devices, desktop computers and internet. As a result, people with cognitive disabilities have nearly no opportunities for accessing the internet. Smartphones and digital devices are virtually non-existing for these individuals. Yet, caregivers' attitudes are comparatively open-minded. Many of the interviewed caregivers did not see substantial risks of smartphone usage by their clients. Instead, they considered potential benefits of smartphone usage for their clients as rather high (see also Sect. 3.3).

No Internet Access for People with Cognitive Disabilities

In this second scenario, only employees have internet. The institutions provide a reasonable digital infrastructure, although not for their clients. Employees, in contrast, have internet access, an email address, and a desktop computer to assist their work. Due to regulations regarding data protection, liability, and fears of problems in these areas,

they do not create opportunities for internet usage or provide internet access for their clients. Interestingly, caregivers show more reluctant attitudes towards their clients' internet use, compared to the first scenario. Fears of data protection and problems due to little media literacy of people with cognitive disabilities give rise to more defensive view towards clients' internet and smartphone usage.

Internet Usage Under Caregivers' Control

Institutions in this third scenario try to offer opportunities to access the internet for their residents. Different approaches were employed; in all cases, however, some forms of internet usage monitoring by employees were established. One institution provided one computer with internet access for all clients. The computer is located close to the employees' offices, so that they can visually overlook the internet usage of their clients: "The computer is can be used by all clients. It is aligned in a way we can monitor it out of our offices". In another institution, residents were allowed to use the employees' computers to access the internet. Some organizations attempted to increase clients' media literacy skills by providing workshops for their residents. Almost all caregiver mentioned the shortage of employees and time concerns. In contrast to the last scenarios, people with cognitive disabilities were deemed able to use existing devices such as tablets, desktop computers, and laptops. Opportunities of usage were restricted due to caregivers' time concerns and attitudes. Likewise, attempts to increase clients' media literacy or to introduce them to new media technologies were limited.

Self-determined Usage

This fourth and final scenario was only found in less institutionalized living situations in which people with cognitive disabilities were living mainly self-determined. In those settings, caregiver provided the support to access digital media and the internet. Specifically, caregivers helped their clients to purchase a smartphone or to deal with internet providers. Furthermore, carers often act as contact persons for internet-related and smartphone-related problems. This includes purchases of phones, phone repairs, purchases of prepaid cards for internet access, or acting as peacemaker for conflicts resulting from WhatsApp or Facebook use. In consequence, people with cognitive disabilities in these settings were able to be more self-determined and autonomous in their decisions, because the level of institutionalization was relatively low. People with cognitive disabilities owned smartphones and were using them almost self-determined. Most had stationary internet access and were able to use their own wireless internet connection. Caregivers appeared more open-minded towards clients' smartphone use, and perceived digital media as a great opportunity for people with cognitive disabilities to participate in society. Furthermore, communication with clients became easier (see Sect. 3.1). Nevertheless, caregivers were also aware of risks (see Sect. 3.3) and saw the challenge of increasing their clients' media literacy.

Taken together, these results corroborate the assumption of a digital disability divide between individuals depending on their living settings. In less institutionalized conditions, caregivers accepted clients' internet and smartphone usage, as well as dealing with arising problems, as tasks of their daily work profile. Perceived behavioral control seems to be an important factor in this context. Helping clients with smartphone or internet problems requires technology skills, media competencies and self-confidence: "We are

helping, if we are able to. Often they are better informed and have more skills than we have," one caregiver stated.

3.3 Caregivers' Experiences with Clients' Internet Use

Caregivers' attitudes towards clients' smartphone use and internet use likewise depended on previous experiences. While experiences in institutionalized living settings were rare, caregivers appeared general open-minded regarding internet usage of their clients. Yet, caregivers with more experience expressed more negative emotions, mainly due to previous problems and effects on their daily work. Especially in outpatient living situations, caregivers' work routine were strongly influenced by their clients' smartphone usage. They often had to settle disputes resulting from their clients' WhatsApp communication. Incorrect behavior in social media, such as posting bad comments or disclosure of personal data, results to intensive employment to this issues.

Stated opportunities and risks also depend on the grade of control. Caregivers in both settings see disability characteristics such as reading competences and cognitive abilities as most important factor for influencing caregiver's attitude towards this topic.

Risks

Caregivers assumed risks fall in four categories: Data protection issues, liability issues, financial risks for clients who make contracts without having sufficient money, and arising costs for institutions due to missing media literacy of their clients. Caregivers reported clients' unwanted disclosure of personal data on the internet or on social media, as well as risks of cyber-mobbing. In most cases, caregivers see themselves as responsible to solve arising conflicts. Most caregivers assumed a responsibility to protect their clients against financial risks and debts. High initial costs of smartphone purchases and high monthly rates are among the most frequently mentioned risks. Liability issues were also mentioned as barrier for clients' internet usage: What happens if people are unable to pay their rates? Who is responsible for possible expenses, or if people download illegal data or surf on pornography websites? The unclear responsibilities prevented caregivers in enabling smartphone and internet usage for people with cognitive disabilities.

Opportunities

Overall, most caregivers agreed that smartphones offer great opportunities for people with cognitive disabilities. They noted that individuals who own a smartphone became prouder and showed more self-esteem. Smartphones are a status symbol for their clients. Yet, they also can get angry and feel not being taken seriously if parents or legal guardians donate them "special phones" like phones with extra-large keys, for example. Another benefit lies in communication features. Mainly caregivers in less institutionalized living conditions reported that voice messaging provides a great communication opportunity for persons who are not able to read. Self-determination can be enhanced as people are independently able to decide who they want to contact or communicate with. For people who are scared to leave the institutions, this offers opportunities to socialize and get in contact with others.

Occurring Problems
Caregivers who are conversant with smartphone usage of their clients were also asked about actual occurring problems in addition to anticipated problems. Fortunately, no illegal downloads or issues of making contracts without having sufficient money were reported. Instead, caregivers stated that these fears have been so far unjustified. Only one case was mentioned in which a contract was not paid by a client.

More problems arise in contexts of social media usage. Caregivers reported harassments of employees by people with cognitive disabilities: "We had a client, for example, who fell in love with a caregiver. This client made a lot of pictures and posted them on Facebook without asking the affected person for permission". Problems with Facebook, WhatsApp or other social media sites were also reported: "This girl was registered on different pages to find her love on the internet. Without knowing the persons, she established contact and met them, without telling someone".

Overall, positive and negative experiences lead to positive or negative emotions regarding clients' internet and smartphone use. Caregiver in less institutionalized care settings mentioned a great impact of problems that began in the online world (e.g., mobbing, conflicts via WhatsApp), which then moved to the offline world and affected caregivers' daily tasks: "Sometimes I have to solve problems for about two hours before I am able to do my work. Conflicts starting in Facebook or WhatsApp cause conflicts among our residents".

Besides the discussed three central factors of caregivers' technology acceptance, further topics were identified in this study. Table 2 displays all ten main dimensions that emerged as relevant in the interviews. Further research is needed to better understand how these factors interact with each other, and to what extent they can be generalized to other care or usage settings.

4 Discussion

The three discussed categories "disability characteristics," "digital infrastructure" and "experiences" constitute important factors for forming caregivers' attitudes towards smartphone usage of people with cognitive disabilities. While technology acceptance factors are empirically well tested for the general population, this exploratory study examined to which extent they can be applied for understanding caregivers' attitudes towards the smartphone use of people with cognitive disabilities.

The review of existing models showed that **perceived usefulness** is an important influence factor. Results of this study indicate that only a few people with cognitive disabilities in residential institutions use smartphones. Interviewed caregivers of these caregivers reported little **experience** with this topic. Yet, they appeared generally open-minded towards clients' smartphone use, and perceive digital participation as important factor for the future. Caregivers in outpatient living situations, in contrast, had more experiences with clients' internet and smartphone use, and showed a more negative attitude towards it.

Additionally, clients' **living situation** and especially the amount of caregiver control played a major role for influencing caregivers' attitude. As Haage and Bosse [28] stated, usage of digital media depends on living situations. This current study confirms these

Table 2. Overview about identified topics

	Main topic	Subtopic level 1	Subtopic level 2
Target group: People with cognitive disabilities	Internet usage of people with cognitive disabilities	Opportunities Risks Suspected problems Occurred problems	Opportunities: • Autonomy • Communication • Relationships Risks: • Data protection • Liability
	Smartphone usage	Usability Rules Usage	Usage: • Facebook • WhatsApp • Online shopping • Communication • Sexual interests
	Disability characteristics	Cognitive abilities Living situation Income Reading ability Legal guardians	
	Interest	Extrinsic motivation Intrinsic motivation No interest	
Structural level: Framework conditions	Institutionalization	Control Protection Laws	
	Institution	Outpatient living situation Resident institution Staffing conditions	
	Digital infrastructure	Wireless LAN Barriers Implementation Missing usage opportunities	Barriers: • Data protection • Liability • Access
	Employees	Engagement Role profile Attitude Media literacy Personal limits Fear Work routine	

(*Continued*)

Table 2. (*Continued*)

Individual level: Own attitudes, experiences and competences	Attitude experts	Attitude Own usage Own media literacy Expert status	
	Wishes for the future	Wishes for the future	Wishes for the future regarding: • Own institution • Digital participation of their clients • Accessibility of digital media

results for people with cognitive disabilities in residential institutions. We examined not only the available digital infrastructure in these institutions, but also focused on caregivers' attitudes towards smartphone usage of their client. Results show that especially the context of institution and caregivers' experiences with smartphone usage in care contexts affect caregivers' attitude regarding technology use of people with cognitive disabilities. Hence, a digital divide among people with cognitive disabilities can be assumed, which largely depends on the living situation. Whereas people in residential institutions have little opportunities for smartphone use, caregivers in outpatient living situations report frequent smartphone usage of their clients. **Facilitating conditions** derived from TAM 3, such as the form of organization or equipment with digital devices (e.g. tablets, laptops, desktop computer) therefore affect the level of digital inclusion.

Another important finding of this study is the relevance of **perceived behavioral control**. As mentioned in Sect. 3.1, caregivers see themselves as contact person for every kind of questions regarding smartphones and internet use. On the one hand, those questions, activities and problems influence caregivers' work routine. On the other hand, it requires competences, technological skills and positive **experiences**, which can strengthen caregivers' self-confidence. Yet, some caregivers might fear a **lack of competences**. This means that caregivers perceive themselves as unable to control or assist activities of people with cognitive disabilities in the internet (see Sect. 3.2). Here, a divergence can be seen between loss of control, strong feelings of responsibility and enhancing self-determination and autonomy. Therefore, strong **feelings of responsibilities**, **protections** and **loss of control** are strong factors that determine caregivers' attitudes towards smartphone usage.

The results of this qualitative exploratory study indicate that neither caregivers nor people with cognitive disabilities are fully satisfied with the current status quo. Contrary to the right of self-determination, autonomy and digital participation, which are included as important goals in the UNCRPD [9], reduced possibilities for self-grow and the fulfilling of the basic human need for participation are still reality in many care settings [9, 31–34]. Nonetheless, institutions for people with cognitive disabilities have a protective function for their clients. It is a narrow ridge between protective functions and giving their clients opportunities in self-determination and personal growth.

This current study reveals gaps between needs, wishes, and rights of people with cognitive disabilities (based on literature results) and feelings of high responsibilities of caregivers that result in attempts "to protect them by restricted internet use [29]. Results of this explorative study suggest that people with cognitive disabilities in residential institutions do not get sufficient opportunities to try out new information and communication technologies. Getting back to the dynamic acceptance process proposed by Hastall et al. [24], people in those living situations are often located between stage one "not being aware" and stage two "forming an opinion about it". Caregivers are influenced by technological (e.g., technology characteristics, perceived usefulness), individual (own experiences, emotions, perceived behavioral control, motivation) and structural factors (digital infrastructure, feelings of responsibilities, institutionalization). Because of strong bonds between caregivers and people with cognitive disabilities, caregivers transfer their own attitudes, experiences and fears to their clients. Problematic are also situations in which clients have developed intentions for smartphone use, but are prevented from using digital technologies solely due to caregivers unjustified negative attitudes.

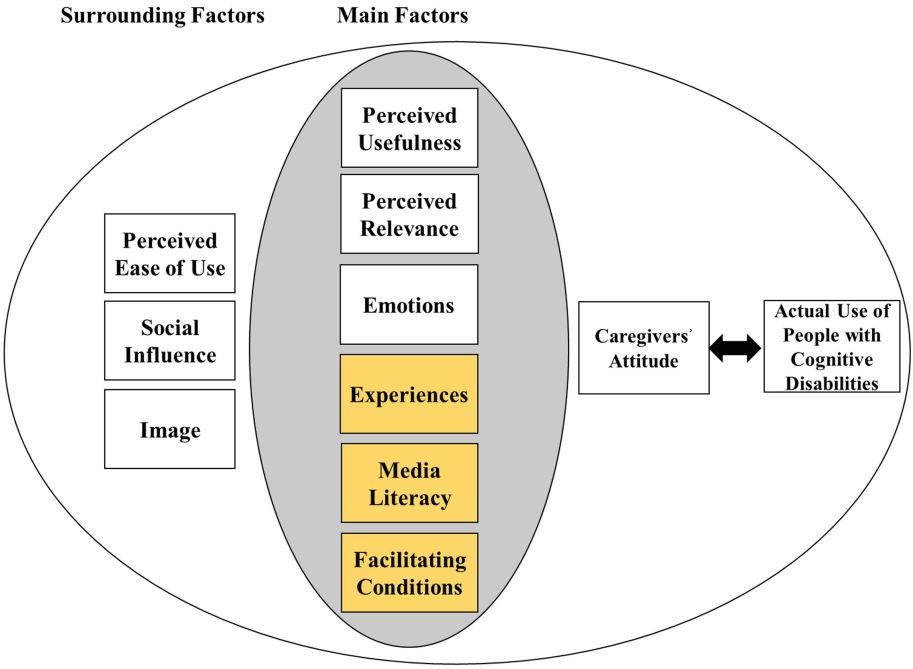

Fig. 2. Revised heuristic of factors influencing the smartphone adoption of people with a cognitive disability (own figure)

Findings also suggest that low perceived usefulness of smartphone usage by people with cognitive disabilities in residential institutions is associated with low experiences by caregivers regarding this topic. Caregivers in this setting show a general open-minded attitude towards smartphone usage by people with cognitive disabilities. In contrast, high perceived usefulness of smartphone usage by people with cognitive

disabilities, combined with experiences of caregivers in outpatient living situations, are associated with more critical views of this topic. Depending on the factors described in Fig. 2, caregivers are willing or reluctant to assist people with cognitive disabilities in developing media literacy skills.

Overall, this explorative research illustrates how technology acceptance processes influence smartphone usage of people with cognitive disabilities in two usual settings of living situations in Germany, Caregivers' attitudes differ depending on living situations of their clients. To improve digital participation of people with cognitive disabilities it is therefore important to have influences of living situations and caregivers' attitudes in mind.

5 Conclusion

Smartphones and internet usage are very common in western societies, but still not for many people with cognitive disabilities. Caregivers bear responsibility towards people with cognitive disabilities. The stronger the grade of control in the institutions, the stronger are feelings of responsibility, which are associated with restrictions regarding clients' self-determination and autonomy. Overall, this study supports the assumption that perceived usefulness, emotions, experiences and behavioral control are important factors for understanding technology acceptance. Yet, it was also shown that additional factors deserve more attention in care settings, particularly grade of control in the respective institutions, living situations, level of competencies, and feelings of responsibility. Caregivers need to be constantly aware of their important role in supporting their clients in enhancing media competences and accessing the internet. It is crucial to not just focus on diagnosed "intellectual disability," but to strengthen efforts to avoid "life-long labeling, stigma and social discrimination and restriction of human rights" [41] for this group. According to the International Classification of Disability, Functioning and Health (ICF), disabilities are understood as a construct between the individual and the environment [42]. It is therefore important to develop solutions that create good matches between caregivers and people with cognitive disabilities. Consequently, caregivers need support for extending their own expertise and media-related competences, and skills for developing solutions how to integrate this knowledge in their daily routines with clients.

Although the previous discussion focused on three dimensions of factors influencing caregivers' technology acceptance, it should be noted that many other factors also play an important role.

Overall, findings suggest that an adapted model of technology acceptance is desirable to better explain the complex role of caregivers for individuals with a disability's technology usage in setting with high caregiver control. The current study is a first step towards a better understanding of this phenomenon, and hopefully inspires further research projects that examine ways to reduce digital divides for vulnerable groups in high-control care settings.

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