Bridging the digital disability divide: supporting digital participation of individuals with speech, language, and communication disorders as a task for speech-language pathology

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Purpose: The goal of speech-language pathology is to ensure and improve the participation of individuals with speech, language, and communication disorders. Continued digital transformation means more participation occurs through digital media, raising questions about the digital participation of these individuals and the role, content, and framework of speech-language pathology, both of which need proactive discussion. This *Perspective Article* outlines a viewpoint on these developments, aiming to stimulate critical reflection and disciplinary dialog on the future role of speech-language pathology in the digital age.

Conclusion: Research indicates that individuals with speech, language, and communication disorders are restricted in their digital participation. There is a lack of comprehensive understanding regarding the impact of various speech, language and communication skills on digital participation across different disorders. If speech-language pathology aims to promote participation and this is increasingly dependent on digital media and information and communication technologies (ICTs) then digital participation must also be a therapeutic goal. Achieving this requires more (participatory) research and corresponding training opportunities for speech language pathologists (SLPs).

KEYWORDS

digital participation, speech-language-pathology, digital divide, speech-language-therapy, speech, language and communication disorders

1 Introduction

Speech, language, and communication disorders (SLCDs) can occur across the lifespan and are due to various etiologies such as traumatic brain injury, Parkinson's disease or developmental disorders, affecting individuals' speech, language and communication skills, thereby limiting their activities and social participation (Frieg et al., 2024). In line with the UN Convention on the Rights of Persons with Disabilities (CRPD) (United Nations, 2006) and the International Classification of Functioning, Disability, and Health (World Health Organization, 2001), speech-language pathology aims to provide therapies that enhance patients' daily lives and societal participation by improving their speech, language, and communication skills. Interventions should consider individual needs and activities in the context of personal and environmental factors (American Speech–Language–Hearing Association, 2016). Consequently, enabling participation in areas such as family life, work, cultural activities, leisure, sports, and political and public life is the therapy goal par excellence (Frieg et al., 2024).

But in recent decades the digital transformation and the use of information and communication technologies (ICTs) has pervaded and influenced all these areas of life. A major challenge is ensuring that all people can participate in this transformation (Adam and Dzang Alhassan, 2021; Ragnedda et al., 2022), and we believe that speech-language pathology can make a significant contribution to securing digital participation for people with SLCD.

This *Perspective Article* presents a viewpoint and is grounded in a critical dialog with current discourses on digital participation and speech-language pathology, aiming to (a) highlight the relevance of digital participation for people with SLCD and briefly summarize key findings on digital participation, particularly in relation to speech-language pathology, (b) direct readers to relevant literature, and (c) offer recommendations for speech-language pathology research, practice, and education. Rather than focusing on a single diagnosis, technology, or clinical setting, we adopt a broader disciplinary perspective that allows us to address structural challenges and overarching issues of accessibility and inclusion across diverse SLCD populations. Given the *Perspective Article* format, the literature has been deliberately selected to draw readers attention to key contributions we consider particularly relevant across different domains of speech-language pathology and to stimulate broader professional reflection and further inquiry.

2 Digital participation

Our daily activities and requirements are increasingly digital activities and requirements (Ragnedda et al., 2022; Steiner, 2023). This includes digital communication via messenger applications, voice notes, and e-mail. Our reliance on services like audio and video streaming, social media, e-books, or gaming is increasing, as is the use of digital assistants or smart-home technology. The ability to use digital platforms is essential for everyday requirements such as online banking, shopping, appointment booking, mobility services, healthcare access, and interaction with public authorities and digital administration. Participation in political and social discourse and peer culture as well as access to information and education are increasingly taking place to an ever greater extent via digital media and ICTs

(European Commission, 2024; Gower et al., 2023; Reddy et al., 2020). Furthermore, the rapid development of artificial intelligence (AI) is also likely to have a significant impact on digital society and our digital activities (e. g. Montag et al., 2024).

Hence, in many respects our lives are significantly influenced by whether we have access to ICTs and can use them. This has made digital participation increasingly important in terms of social participation (Adam and Dzang Alhassan, 2021; Ragnedda et al., 2022). In Calmbach et al. (2020) view, "social participation is digital participation" ("Soziale Teilhabe ist digitale Teilhabe," German, p. 325). Expanding on these views, we conceptualize digital participation as follows: Digital participation is both a requirement and a component of various forms of participation. It encompasses access to social, educational, professional, and health participation, as well as cultural, leisure, and political and public life activities. This includes the ability to use hardware, software, and digital services that are essential for engaging in the digital society and undertaking self-determined and meaningful activities. Digital participation is crucial for inclusion, access to opportunities, and engagement in the digital economy and society. Exclusion from digital participation leads to a lack of opportunities and resources in everyday life.

3 Digital participation in speech-language-pathology

Such digital advancement significantly changes interactions that influence speech, language and communication. What digital media and language have in common is their ubiquity and their role in facilitating participation (Schulz and Reber, 2023). If the aim of speech-language pathology services is to promote participation and the degree of participation is increasingly dependent on digital media and ICTs, then speech-language pathology must consider digital participation as an additional therapeutic goal. In recent years, the focus with regard to digitalization in speech-language pathology has primarily been on implementing, adapting and evaluating digital therapeutic methods and diagnostic tests for various patient groups. This includes teletherapeutic services [for a review, see Weidner and Lowman (2020)] and therapeutic or diagnostic apps [for a review, see Saeedi et al. (2022) and Thunstedt et al. (2020)] that serve as extensions of or additions to traditional services, along with their evaluation and efficacy. However, this focus does not necessarily relate to the digital participation of people with SLCDs, a topic that has received less attention in published research.

4 Digital inequalities: the digital divide

Currently, there is limited knowledge about how people with SLCD engage with digital activities and ICTs, including the barriers they encounter. Generally, research has revealed that various groups of people—including those without disabilities—are hindered or excluded from participating in the digital transformation due to intersecting factors such as age (with older individuals being more affected; e. g. Cotten, 2021), gender (with women facing more disadvantages; e. g. OECD, 2018), education and income (particularly those with lower socioeconomic status characterized by lower formal education and lower income, e. g. OECD, 2021) and environment

(with individuals living in rural areas being more affected than those in urban settings; e. g. OECD, 2021; Robinson et al., 2020). These overlapping and intersectionally intertwined social determinants contribute to the "digital divide," which is described across three levels (for review see Lythreatis et al., 2022; van Dijk, 2020). The "first-level divide" concerns the availability of hardware, software, and internet access, while the "second-level divide" addresses different patterns of usage (van Deursen and Dijk, 2019). However, focusing solely on access or usage patterns is insufficient to fully depict digital inequality. It is also important to examine the extent to which different groups derive benefits and opportunities from digital media and internet use, known as the "third-level divide" (Ragnedda and Ruiu, 2018; Ragnedda et al., 2022).

5 Digital disability divide of individuals with speech, language and communication disorders

Research on the digital divide, particularly concerning individuals with disabilities, uses the term "Digital disability divide" to address exclusion mechanisms affecting this group (Dobransky and Hargittai, 2006; Sachdeva et al., 2015). In this context, research has focused either on several forms of disability at the same time (e. g. Borgstedt and Möller-Slawinski, 2020; Bosse and Hasebrink, 2016; Johansson et al., 2021; Lancioni et al., 2022; Newman et al., 2017) or on specific forms, such as intellectual and learning disabilities (e. g. Alfredsson Ågren et al., 2020; Caton et al., 2023; Glencross et al., 2021; Heitplatz et al., 2021). This research shows that people with disabilities face a wide range of barriers in ICT access and digital participation across all levels of the digital divide.

Findings on the digital disability divide are important for speech-language pathology. They underscore that alongside cognitive skills such as memory, executive functions, and attention or visual perception (Menger et al., 2015) limited skills in reading, writing, (verbal) language production, comprehension or communication constitute as a barrier and have a negative impact on digital participation at almost every level of the digital divide (Bendrat, 2021; Heitplatz et al., 2021; Pettersson et al., 2023; Rogalla, 2021).

Johansson et al. (2021), for instance, pointed out that "People with disabilities related to language and understanding reported more difficulties using the internet than other disability groups" (Johansson et al., 2021, p. 105). In this study, this group – along with individuals with learning disabilities – faces some of the greatest challenges in navigating through the digital world, including difficulties e. g. with searching, managing passwords, interacting with user interfaces and understanding online information. In addition, the study of Johansson et al. (2021) indicates that women with SLCDs like aphasia are particularly less likely to have access to digital devices such as computers or smartphones. This example illustrates the importance of reiterating that the digital (disability) divide must be viewed through an intersectional lens, as all factors mentioned do not operate in isolation but interact in complex ways, reinforcing and amplifying each other's effects on digital participation.

Nevertheless, research specifically focused on individuals with SLCD or on digital participation as a therapeutic goal within speech-language pathology services is rare. Existing research addresses a wide range of specific digital activities (e. g. voice assistants, social media or video meetings) and etiologies associated with impairments in speech, language, and communication such as: autism spectrum disorders (e. g. Glumbić et al., 2022; Kumm et al., 2022; Pliska et al., 2023), Down syndrome (e. g. Barbas et al., 2018; Zaynel, 2017), Parkinson's disease (e. g. Hall et al., 2023; Marxreiter et al., 2020) or traumatic brain injury (e. g. Brunner et al., 2025; Brunner et al., 2021; Büttner-Kunert et al., 2023). People with aphasia (e. g. Azevedo et al., 2023; Kelly et al., 2015; Kinsey et al., 2022; Menger et al., 2015; Sitren and Vallila-Rohter, 2019) and those with complex communication needs who use augmentative and alternative communication (AAC) (e. g. Bosse et al., 2020; Grace et al., 2023; Keeley and Bernasconi, 2023) receive greater attention; young people or children with (developmental) language disorders (e. g. Durkin et al., 2010; Shelton et al., 2023) and people who stutter (e. g. Rosenberg and Kohn, 2016; Wu, 2023) receive less.

Regardless of the specific disorder, this research also indicates that limited abilities in reading, writing, (verbal) language production, comprehension, or communication are significant barriers that hinder digital participation across the levels of the digital divide — i.e. access, usability, benefits and opportunities. Overall, this seems plausible when considering that a large part of interaction with ICTs and digital media occurs through (written) language. For instance, it's apparent that individuals with speech impairments like dysarthria may find it more challenging to use digital assistants or send voice messages, while those with reading disorders such as dyslexia face difficulties in engaging with social media. Nevertheless, ICTs and digital media can offer new avenues for helping individuals with SLCD participate socially and maintain connections with family and friends. For example, people with aphasia can benefit from using social media (Brunner et al., 2022; Kurfess et al., 2023). Furthermore, there is indication that ICTs can alleviate common symptoms of SLCD, such as word-finding difficulties, through features like word prediction or using voice assistants (e. g. Azevedo et al., 2023; Núñez Macías et al., 2023). For example, using the text-to-speech function can allow individuals to understand texts without reading them. For those with impaired language comprehension, overlay tools or generative AI can simplify internet content by translating it into plain language or summaries. There are certainly many other unique opportunities that ICTs and digital media provide to individuals with SLCD.

In this context, however, another perspective on digital participation and digital exclusion deserves attention. While individual impairments and limited abilities associated with SLCDs can restrict digital participation, a sole focus on these deficits falls short. Therefore, the perspectives of Critical Disability Studies (CDS) and Culturally Responsive Practice (CRP) offer additional important theoretical frameworks to be considered.

CDS seeks to establish a broader understanding of disability that systematically incorporates social, cultural, economic, and political dimensions. It critically interrogates both medical and traditional social models of disability, instead emphasizing the role of structural power relations and normative exclusions (e.g., Ellis et al., 2025; Goodley, 2024). From this perspective, digital exclusion and the digital disability divide are not solely caused by individual impairments or abilities, but by systemic and intersecting barriers, such as those embedded in the design of digital technologies, in linguistic and communicative norms, or within institutional structures, including speech-language pathology. Digital participation is therefore not merely a matter of individual abilities that need to be addressed as part of therapeutic

interventions, but also reflects systematic conditions. It raises fundamental questions about accessibility, cultural inclusion, the social construction of disability, and the distribution of power in both technological and professional contexts (Kao, 2025). In this regard, it is important to emphasize that the "non-use" of (specific) digital media should not be the result of lacking opportunities, limited accessibility, or restricted competencies, but rather the outcome of individual decisions (Bartelheimer et al., 2020; Sponholz and Boenisch, 2021).

In line with CDS and evidence-based practice (EBP), CRP provides a complementary perspective that has gained increasing relevance in education and healthcare. CRP refers to an approach that acknowledges and actively incorporates individuals' cultural identities, values, and lived experiences into professional practice and the design of services. Its core aim is to promote equity, participation, and social justice, especially in contexts shaped by structural marginalization (Gay, 2018; Hamilton et al., 2020). In speech-language pathology, CRP has so far primarily been discussed in the context of multilingualism (for a review see Sinclair et al., 2025). However, digital participation should also be examined through this lens, as it is also shaped by cultural, technological, and socioeconomic factors. Clinicians must be aware that access to digital resources, media use, and communicative practices is not equally available or self-evident for all clients. From a CDS-informed perspective, this again highlights intersecting forms of inequality—for example, when linguistic, financial, technological, and cultural barriers interact.

6 Discussion and future directions

Based on these, albeit sparse, data, it can be assumed that there is a digital disability divide in terms of digital participation for people with SLCD due to limited skills in reading, writing, (verbal) language production, comprehension or communication. However, this divide is not solely attributable to individual impairments and abilities, but also shaped by systematic and intersectionally intertwined socioeconomic factors and systematic barriers, that further restrict access and participation.

From our perspective, the current state of research is insufficient in different ways: Studies on the digital disability divide do not adequately focus on individuals with SLCD and their specific challenges in reading, writing, (verbal) language production, comprehension, and communication. Conversely, speech-language pathology research does not sufficiently address digital participation. While, as outlined above, there are some insights into specific digital activities for certain disorders, a comprehensive understanding of the barriers, needs, arising opportunities, and support systems for individuals with SLCD is lacking – also when viewed through a CDS lens that accounts for structural conditions and intersectional inequalities in digital contexts. Interestingly, the level of digital participation also seems to depend on the acceptance of technology and support provided by the environment. So far, speech language pathologists (SLPs), as a potentially supportive part of the environment, seem to offer little here so far (Keeley and Bernasconi, 2023; Leinweber et al., 2023; Shelton et al., 2023). Based on the above considerations, we make the following recommendations in the areas of research, practice and education.

6.1 Research: addressing language-specific skills and individual needs

In speech-language pathology research, there is still a lack of knowledge about the specific digital needs and difficulties faced by different groups with SLCD. We recommend that research on digital participation be expanded, and that greater consideration be given to speech, language and communication skills in addition to cognitive or motor skills. Future research should investigate the digital abilities and needs of this group of people, considering various disorders and activities. It should also be determined which ICTs and digital media can be used as alternatives or supplements to compensate for the lack of participation opportunities caused by SLCD. It seems advisable to design these research projects in a participatory manner and to involve clients directly. Reflecting these recommendations, future research should also adopt an intersectional lens grounded in insights into the digital divide, that considers socioeconomic inequalities and systematic barriers, drawing on the framework of CDS. Furthermore, through interdisciplinary research collaborations with technology specialists, the goal should be to customize digital technologies to meet the specific needs of individuals with these disorders.

6.2 Practice: integrating digital participation in speech-language pathology framework

The changing conditions for participation raise questions about the role, content, and framework of speech-language pathology, which should be discussed proactively. Our second recommendation is to integrate digital participation into speech-language pathology services, making it a standard component to support all forms of participation dependent on reading, writing, (verbal) language production, comprehension or communication skills. Considering the digital needs of clients and providing digital opportunities should become routine when addressing speech, language, or communication disorders. Sending voice notes, interacting with voice assistants, using AI to make content easier to understand, video telephony or networking on social media: Empowering patients to digitally participate within their abilities, while fostering the necessary speech, language, and communication skills, can be a participation- and activity-oriented task, close to everyday life speech-language pathology. To support the transfer into clinical practice, these aspects should also be incorporated into evidence-based guidelines. For example, the "INCOG 2.0 Guidelines" on cognitive-communication disorders highlight the importance of digital technologies for participation and emphasize the need to systematically promote related competencies among clinicians (Thoma et al., 2023; Togher et al., 2023).

Given that patients' environment impacts their access to and use of digital services (Keeley and Bernasconi, 2023; Leinweber et al., 2023), another intervention could be to offer training, further education or counseling to people with SLCD on how to use technologies and digital media for participation with an understanding of the effect of environment, similar to what is already practiced in the field of AAC (American

Speech–Language–Hearing Association, 2016). However, from a CDS and CRP-informed perspective, clinicians must become and remain aware that access to digital resources, media use, and communicative practices is not equally available or self-evident for all clients. This awareness also requires a critical reflection on one's own assumptions about digital technologies and on the implicit role as "Gatekeepers" (Keeley and Bernasconi, 2023, p. 10) SLPs may adopt. Decisions about which digital tools or services are introduced in interventions can unintentionally reproduce normative expectations about communication, participation, and therapeutic relevance, especially when they overlook the intersecting barriers that shape clients' everyday realities. Instead, CRP helps to promote a reflective and participatory stance that centers the perspectives and needs of clients and families in the design of interventions, including, and especially, in digital contexts.

6.3 Education: developing appropriate training programs for SLPs

Our last recommendation is to offer suitable training or professional development opportunities for SLPs in this realm. Aspects of digital participation and their relevance to everyday life should be equally considered and integrated in existing education programs and curricula – also in light of concepts from CDS and CRP. In Germany, there is an ongoing discussion about the need for digital assistance and additional qualifications for practitioners such as physiotherapists and SLPs (Kubicek, 2021). Insights from Switzerland, where schools have adopted the use of "Pedagogical ICT Supporters" (PICTS), could be valuable (Müller and Staub, 2022). A look at other disciplines such as occupational therapy, where similar discussions are taking place, can also be helpful for future considerations (e. g. Larsson-Lund and Nyman, 2020; Wallcook and Morris, 2017).

In summary, speech-language pathology, with its unique focus on social participation, needs to proactively cross the threshold and embrace the opportunities that digitalization holds for people with SLCD to improve their everyday lives. This *Perspective Article* is intended to help advance the discussion in research, practice, and education of evidence-based speech-language pathology.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Author contributions

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