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"You have to argue the right way": user involvement in the service delivery process for assistive activity technology

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ABSTRACT

Purpose: This article critically examines user-involvement in the service delivery process for assistive activity technology.

Methodology: Data were collected in semi-structured interviews with 44 end users of assistive activity technology and in focus group interviews with 11 professionals at Norway's Assistive Technology Centre. Data was analysed according to a stepwise deductive–inductive approach.

Findings: Flawed organisational principles like division of responsibility, unclear regulations, and a lack of competence with assistive activity technology among service professionals have hindered user involvement in the service delivery process.

Conclusion: A missing knowledge of assistive activity technology among professionals and the current organisation of services creates barriers for a positive collaboration with users in the service delivery process of assistive activity technology.

➤ **IMPLICATIONS FOR REHABILITATION**

- The spread of information among users and courses for professionals should be expanded to ensure the necessary competence with assistive activity technology within the service delivery process.
- In developing the service delivery process for assistive activity technology, professionals should act less as guardians of traditional functional requirements and more as active providers of different technological solutions.
- The service delivery process for assistive activity technology should allow long-term testing to identify relevant social and physical factors affecting the use of this type of technology, before delivery.
- Guarantees and complaint systems should be established in the service delivery process for assistive activity technology.

Introduction

In the Nordic welfare states ensuring the right of equal participation for all citizens has been a political objective since the 1990s [1]. Since then, these states have aimed to provide disabled citizens with the same opportunities and access to social and cultural activities, as well as leisure, sport, and exercise activities [2], as everybody else. User-involvement is considered an important aspect in the service delivery process of assistive technology (AT) designed to promote such activities. This article critically examines the processes associated with applying for and obtaining such technology in Norway. In the International Classification of Functioning, Disability and Health, AT is defined as "any product, instrument, equipment or technology adapted or specifically designed to improve the function of a disabled person" [3]. Within that broad category, the study presented in this article involved examining the service delivery process for a subgroup of AT—namely, assistive activity technology—that is designed to help people with disabilities to participate in physical activities,

including outdoor activities, sports, other forms of exercise and play, and physical education [2].

In the last two decades, researchers who study AT have investigated how the service delivery process for the technology affects the outcomes of its service delivery. As a result, they have observed that all parts of the service delivery process for AT are important factors of whether the technology is used or abandoned [4], as well as that being an informed consumer of AT significantly influences a user's satisfaction with an AT device [5]. When the service delivery process is successful, the selected AT can improve users' independence, participation in social and individual activities, and both subjective and social wellbeing [6–10]. Researchers have also observed that AT devices with the lowest rates of abandonment have been purchased by users who played a strong role in choosing their devices, could try them out and talk to other users about them, and already knew what options were available [5]. Moreover, training in using the technology has been shown to positively affect the outcomes of the service

delivery process for AT users [6,11] and to support more individually appropriate choices of the technology [12]. Such findings confirm that taking a client-centred approach in the service delivery process is important to satisfy AT users [6,11,13–16].

However, due to unsystematic information and high costs, people with disabilities can also face difficulties in accessing AT tailored to meet their individual needs [17–19]. On top of that, researchers in Sweden have shown that having users take increased responsibility for their AT has revealed considerable differences among them in terms of their user knowledge, interests, and access to the technology [20]. Given the range of users, though ones who are informed and can choose appropriate AT for themselves positively affect the outcomes of the service delivery process [5,13,20,21]. A strongly consumer-oriented service delivery system could also threaten the opportunities of less informed users to participate in play, sport, and leisure-time physical activities. In particular, key actors in the field of assistive activity technology, like physiotherapist and occupational therapist, teachers and coaches in sports clubs, demonstrated a lack of knowledge about that subgroup of AT [19]. However, to date, studies on the overall service delivery process for AT have been few [4]. Furthermore, identifying particular outcomes has shown to be challenging due to the differing mandates and interests of the varied stakeholders [22]. In the Matching Person and Technology assessment process [23], consumer perspectives are considered to be affected by psychological and sociocultural factors. Prescibers focus on functional gain and personal well-being, and the primary concerns of engineers and suppliers are design elements and the usability of the technology [24,25].

In response, the study reported here entailed investigating user involvement in all parts of the service delivery process for assistive activity technology in Central Norway to determine how services' organisation, interests and competence with assistive activity technology among service professionals affect user involvement in the service delivery process. It is thus central to this text that user satisfaction is not the simple outcome measure; rather the outcome is related to the question of how the technology meets the user's individually defined goals.

Allocation of at in Norway

Norwegian welfare policies regarding AT have afforded generous access to such technology to the Norwegian public. In general, Norwegian citizens have a legal right to access the AT that they might need, which is provided free of charge as a benefit of national insurance. In light of that provision, AT has thus become part of planned solutions aimed at safeguarding all Norwegian citizens' social inclusion and individual function in their professional work, education, and everyday lives [26]. In helping to meet those ends, the purpose of the service delivery process for AT is to find solutions to users' practical problems. However, to ensure that national insurance funds for AT are used effectively and according to regulations, municipal authorities, as part of the service delivery process, have to meet prospective AT users, assess their needs, help them to apply for AT, and customise the AT to meet their needs [27, p.14]. As a result, municipal services in Norway have become central in informing prospective and current AT users about AT.

In cooperation with the municipal services, a public office, the Assistive Technology Centre, works as a competence centre in each Norwegian county to support municipal authorities, assess applications for AT, and distribute the technology as appropriate. The Assistive Technology Centres have also established a system for buying AT in large quantities *via* advertising tenders to private contractors. Both municipalities and the Assistive Technology Centres thus work as intermediaries between private enterprises offering the technology on the market and end users who obtain AT by applying for it. If a prospective user's application is granted, then he or she, in cooperation with municipal service providers and the Assistive Technology Centre, tries out different kinds of technology to determine which is most suitable for him or her as an end user. Even when delivered to the end user, however, the AT remains public property. For the allocation of assistive activity technology in particular, end users pay 10% of the cost up to NOK 4000 in order to borrow the technology from the state, even on a permanent basis if necessary [2].

User involvement in the service delivery process for AT

The processes of facilitating and customising welfare services for users' needs require users to participate in the service delivery process, which, in turn, affects how the service is organised [28,29], both internally and in terms of its overriding political and strategic objectives. Although service delivery for AT can be organised in various ways, certain stages are consistent across countries: initiative, assessment of need, selection of the assistive solution, selection of the equipment, authorisation, implementation, and management and follow-up [30, p.136]. The Association for the Advancement of Assistive Technology in Europe (AAATE) and the European Assistive Technology Information Network (EASTIN) specify six qualitative criteria important in predicting the success of the service delivery process: accessibility, competence, coordination, efficiency, flexibility, and user influence [30, p.136].

The last criterion, user influence, encompasses users' empowerment during individual assessment, the communication with the user in the service delivery process, and the user's ability to influence decisions during the process. User influence receives particular focus in this article, especially with regard to how users become involved in the service delivery process of assistive activity technology. At base, user involvement is a relational concept, for collaboration necessarily involves two or more partners [31]. Professionals who wish to actualise user involvement have to work systematically to correct their own knowledge with reference to users' experiences [29,p.17]. User involvement not only demands that the user's point of view and understanding are considered but also influences both how the process runs and the outcome [31]. The perspectives presented in this article showcase how organisational principles and understandings between professionals and users affect how users become involved in the service delivery process for assistive activity technology. The outcome of the service delivery process is related to the degree to which the technology meets the user's individually defined goals. These are goals created through social interaction in the context where the technology is used. Simply focussing on user satisfaction with the technology as such is thus not the sole outcome success criterion.

Different ways of understanding user involvement in practice

To understand and describe user involvement, researchers have outlined approaches that differ in focus from the individual level to the system level and in the extent to which users are involved [28,29,31–33]. Of course, practices of user involvement can also differ depending upon the meaning given to the concept [33]. Sometimes *user involvement* means "process orientation," in which users present their own viewpoints and actively influence

practitioners' planning and decision making; at other times, such practices focus on content and the outcome, which limits consultation with users.

One way to understand user involvement is to consider the user's degree of ownership of the targeted problem [31]. That understanding of user involvement is based on the user's degree of interaction with the problem, opportunities to identify what the problem entails, and understanding of his or her capacity to solve the problem. For professionals in Norway, applying that understanding requires users with the opportunity to take initiative to contact, maintain contact, or end contact with the social welfare system.

The service delivery process for AT shows promise as a tool for actualising user involvement. However, to find a good match between end users and providers, both parties' close, active collaboration is crucial [27]. To ensure such collaboration, additional knowledge about the extent to which involvement with users is part of the service delivery process for assistive activity technology remains necessary. Accordingly, to identify how professionals at Assistive Technology Centres and end users of assistive activity technology experience user involvement in the process, the study presented here involved examining those experiences at the individual level and how the individual right to influence the nature of individualised help and services within the service delivery process for assistive activity technology is ensured.

Methodology

Study design

The study was inspired by the sociological perspective of social constructionism, which explains how social and structural trends intervene in how social phenomena are created and understood [34,35]. In the social constructivist understanding, people understand their worlds and develop their own particular meanings with reference to their experiences. In that process, their individual meanings are often negotiated both socially and historically [36]. Such a perspective can illuminate how professionals and end users of assistive activity technology understand user involvement and view the outcomes of the service delivery process.

Ethical considerations

The Norwegian Centre for Research Data (NSD) approved the study (reference no. 45484). The recruitment of users as informants was anonymous, whereas that of professionals was conducted openly within their respective organisations. To avoid so-called "research burnout" among professionals in the field, data collection involving focus group interviews [34, p.99] was performed as part of other research on the use of assistive activity technology among children and youth [19]. The collaborative collection of data was approved by the NSD. The researchers informed all informants that their participation was voluntary and that they could withdraw from the study at any time. Last, personally identifying information was removed from the empirical material, and audio files and notes were stored immediately after the interviews on a secure hard drive at the workplace of one of the researchers. All informants' names used in this article are pseudonyms.

Sample and recruitment

Recruiting informants—users and professionals at the Assistive Technology Centres—proceeded using a strategic sampling method [37]. To that end, recruitment targeted people with impaired mobility who use assistive activity technology and professionals who work in the allocation of assistive activity technology.

Three involved Assistive Technology Centres in central Norway recruited users as informants by sending written invitations to all persons in their overall database who met the inclusion criteria: had mobility impairments, were aged from 18 to 67 years, and had received an assistive activity technology in the last 18 months under the National Insurance Act. Users agreed to participate by text message, email, or returning an informed consent letter by mail. Of the 51 users who consented to participate as informants, 44 ultimately took part in the study.

Professionals at the Assistive Technology Centres were recruited by contacting the head of each centre, who asked employed professionals whether they were interested in participating in a focus group interview. One professional at each centre took responsibility for practical planning and communication to prepare for the interviews. In all, three to five professionals from each of the three Assistive Technology Centres in central Norway participated, with a total of eleven professionals — 2 men and 9 women – consenting and participating. The professionals' backgrounds were varied. They were occupational therapists, a physiotherapist, lawyers, and technicians. Their work experience with allocating assistive activity technology also varied from less than a year to almost twenty years.

Data collection

Data were collected in the period from February 2016 to February 2017. The first author conducted semi-structured in-depth interviews with the users of assistive activity technology that encourage them to describe their personal experiences with the service delivery of this type of technology. The author asked open-ended questions about their involvement as users in the service delivery process and their experiences with using assistive activity technology. Examples of questions asked were "How did you experience the process of assistive activity technology allocation?" and "How did you influence the decision to obtain the specific technology that you received?" With reference to earlier research on AT use [16,38–41], the interview guide built upon five themes: allocation process and user involvement, technology and function, identity and personal preferences, social interaction, and physical activity. The first two themes yielded the most information relevant to the topic under study. Most of the interviews lasted less than one hour and were audiotaped and transcribed.

Interviews with users were supplemented by focus group interviews [34, p.99] with professionals at each of the Assistive Technology Centres, to gain insights into user involvement in the service delivery process from the professionals' perspectives. In sum, there were three focus group interviews, each with three to five professionals from the same Assistive Technology Centre. The focus groups took place in a meeting room at each of the centres, during worktime, and lasted approximately one hour. The professionals discussed open-ended questions on the same themes as in the individual interviews, albeit altered slightly to accommodate the professionals' perspective to allow more specific questions concerning the organisation of services, their experiences with regulations, the selection of assistive activity technology, and their understanding of user involvement. Examples of questions

Table 1. Codes and code groups.

Code groups:	Codes (examples):
1. Getting the help that you need requires having the same possibilities as others	• You end up not applying if the process is to complex • There will be trial and error because users are different • It is important to provide good information to people who come in such situations • Emphasis is placed on the social surroundings, people that can assist • That is what I had to write to get the AAT
1. Practically using AAT requires understanding	• In the practical understanding, there is a lot of responsibility on the municipality • Asphalt, grass, gravel, mountains, an aid can be used for many activities • It is not enough just looking at it and think it will work • They are professionals, but they do not have practical experience themselves

asked were "What do you think is important to focus on in the allocation of assistive activity technology?" and "What could have been done differently to meet the user's needs?" Professionals also answered questions concerning their knowledge about users' individual conditions, the effects of individual differences, and use of the technology. In one of the focus group interviews, the first author acted as the moderator; in the second interview a research assistant was the moderator; and in the last interview a researcher from a tandem project was the moderator. The interviews were audiotaped and transcribed.

Analysis

Analysis followed a stepwise deductive–inductive (SDI) approach [34], which prescribes continually alternating between an inductive interpretation and theoretical proximity during analysis. In general, the goal of using the SDI approach is to create codes generated from data, not from theory, hypotheses, research questions or previously set themes [34]. The SDI approach agrees with scientific-theoretical terms in Grounded Theory (GT) – the inductive principle – but differs with its clear theoretical ambitions and employs a stricter terminology [34, p.5]. In the first step of the approach in the study reported here, the first author performed a detailed inductive coding; she read the text thoroughly, identified parts of the text that carried meaning (e.g., striking nouns, verbs of action, anecdotes on assistive activity technology use, and comparisons), and coded them. The coding in SDI is referred to within GT as open or initial coding [42, p.116] and as eclectic coding in other qualitative coding strategies [43, p.188]. Coding resulted in approximately 600 codes, coded in the software programme NVivo.

In the second step, the first author grouped codes that seemed relevant to the research question and exhibited an inner thematic meaning. The groups of codes represent the themes considered in analysis. To validate coding and code grouping, as well as to evaluate the possibility of data saturation, the authors conducted a joint analysis.

In the last step, theory was applied to support the analysis with a framework for understanding the empirical material and, in turn, exploring new theoretical aspects. Analysis yielded six code groups, two of which formed the foundation for the themes used to organise the findings (Table 1): concerning the organisation of services, "Getting the help that you need requires having the same possibilities as others," and concerning competence with the practical use of assistive activity technology, "Practically using assistive activity technology requires understanding."

In the following section, the findings reveal how both users and professionals have experienced the service delivery process for assistive activity technology from initially receiving or distributing information to the outcomes of the process. The themes,

presented according to the different steps in the service delivery process, offer new insights into aspects of user involvement in the service delivery process. Later, in the Discussion section, theoretical perspectives are used to support understandings formed about what the findings imply.

Findings

Among users, 11 women and 33 men, aged from 18 to 67 years and with different levels and kinds of impaired mobility, participated in the study. The main features of users in the sample appear in Table 2. Among professionals at DATs, three men and eight women participated, who as a group had different educational backgrounds (training in occupational therapy, physiotherapy, law and a technician).

Above all, the findings indicate confusion in the Norwegian public welfare system regarding how the Assistive Technology Centres understand their practice and work. On the one hand, service professionals at the centres reported their role as gatekeepers of social services in a traditionally modern bureaucratic way. As such, they have guarded public funds and performed individual assessments of prospective users' medical diagnoses and functioning according to a strict set of rules and regulations. On the other, they also reported having a responsibility to assist and offer technical solutions when physiotherapists and occupational therapists working in the municipal services assist users to try out assistive activity technology and have their technology customised. On the whole, experiences with user involvement in the service delivery process among end users and professionals seemed to be influenced both by the professionals' competence with assistive activity technology and by how the service delivery process was organised. The users and the professionals represent different perspectives to be considered when assessing the user's need for this kind of technology in the service delivery process.

Barriers to individual customisation of assistive activity technology due to the organisation of services

The findings in this section primarily represent Code Group 1, although some represent Code Group 2. This section focuses on the organisation of the service delivery process in the allocation of assistive activity technology and on how regulations have often conflicted with the individual customisation of such technology. The findings underscore the importance of the professionals' and users' knowledge of assistive activity technology in fostering user involvement in the service delivery process and in organising the process to facilitate the spread of information about this type of technology. However, they also highlighted obstacles to the individual customisation of assistive activity technology and to the gathering of feedback during its delivery.

Table 2. Main features of the sample of assistive activity technology users.

Gender	Female (*n* = 11)	Male (*n* = 33)			
Age	18–30 years (*n* = 7)	31–45 years (*n* = 14)	46–60 years (*n* = 16)	61–67 years (*n* = 5)	Unknown (*n* = 2)
Mobility-Equipment used	Electric Weel Chair (*n* = 27)	Manual Weel Chair (*n* = 19)	Crutches /Caine (*n* = 9)	Foot prosthesis (*n* = 3)	No mobility equipment (*n* = 10)
Activities by using AAT	Outdoor individual summer activity (*n* = 41)	Outdoor individual winter activity (*n* = 14)	Outdoor team activity/sport (*n* = 12)	Indoor individual activity (*n* = 4)	Indoor team activity (*n* = 9)

Practising individual customisation versus providing uniform services in the service delivery process

An organisational tool for prioritising applications for assistive activity technology, the national standard of products changes every year as new price offers are negotiated [2]. However, the fluctuation in the standard has complicated how users have obtained their desired technology. In the sample of users, such was especially the case if they had wanted the same technology that they had before, even though such continuity benefits users because they already have the knowledge and skills to use the technology. For users who had desired assistive activity technology not in the dispensation scheme, the required applications for special dispensation had complicated the service delivery process, increased its burdensomeness, and led to low approval rates. The reason for the complication seemed to be that professionals had often prioritised what seemed appropriate according to the national standard of products when considering functional requirements. According to one of the professionals at the Assistive Technology Centres, Gunn, in the first focus group (Group1):

> If we [Assistive Technology Centre professionals] go from Option 1 to Option 2, for example, then there have to be functional benefits with the bike in Option 2. It does not matter whether the user thinks that it has a better look or something like that; function determines whether we choose to go to the next step.

Of course, how the Assistive Technology Centres conceived using the dispensation scheme to meet users' needs varied. Markus, a professional from another centre (Group 3), explained that the centre he worked at focus on finding the best match between users and the technological solutions available:

> Our focus or job as consultants is to find the right match between users and their needs within the existing range [of options]. At least that's our focus in testing: to find the match that will work, something that will be used and not left standing in the garage.

On that topic, another professional from the same Assistive Technology Centre (Group 3), Turid, partly countered by adding, "We're not afraid to dispense equipment if we think that it's right. No, in that case, then we do it." Such differences between the centres in how the professionals there have assessed users' needs reflect differences in their understanding of how to weigh users' needs against the national standard of products. Differences in assessments also concerned socially related needs, such as user-friendliness based on design that matched the user's style or age group. In general, it seemed that Assistive Technology Centres had tried to customise assistive activity technology that would meet users' needs, to uphold the national standard of products, and to neutralise the supplier's intention of sale, all of which had led the centres to control how suppliers have interacted with users. That tendency surfaced in Markus's comment about how he and his colleagues had involved the suppliers only when adjustments to a product were necessary, not entirely new products: "We don't send the suppliers in cases when users want to choose a new product that we don't know about. We control that

part." Markus's words underscore the intermediate role of the Assistive Technology Centres in working between end users and the suppliers, who not only have expertise about specific assistive activity technology but also intend above all to sell their products. In this way, the suppliers hold a dual role, as both experts in their products, while also being private contractors.

Initiating the general spread of information and practical testing in the service delivery process

At the start of the service delivery process, what users already knew about assistive activity technology had proven to be important to the process, because such knowledge had necessarily motivated them to take the initiative to act in the first place. Therefore, the general spread or transmission of information about assistive activity technology seemed to important for the service delivery process. Most users had found information about assistive activity technology on the Internet, whereas others had acquired it from people in their social networks, especially ones with disabilities whom they knew from sport teams and other organisations. As Arne (24 years old) described, "I have a network around me, with quite a few disabled people who can tell me about different activities and things to do." That social aspect of information sharing had given users already active and integrated into activities even better access to information than the access among ones without extensive social networks. Users also reported having practically tested assistive activity technology during social activities under the supervision and with the help of other users. Assistive Technology Centre professionals added that, for users, such practical testing had been an important aspect of becoming informed, because it is necessary to gauge how the specific technology will accommodate the individual's unique circumstances.

Assistive Technology Centre professionals also reported that to foster information sharing and practical testing, they had organised so-called "activity days," albeit by following different approaches. One Assistive Technology Centre had arranged activity days when users could test different assistive activity technology s in the presence of other users, professionals, suppliers, and representatives from user organisations. Whether the users planned to use the technology alone or with others had affected what kind of solutions they had found to be practical, which, in turn, had been affected by the user's physical environment. Some professionals explained how they had organised activity days to allow users test to various forms of assistive activity technology under different physical conditions with supervision from relevant others. In a dialogue from one of the focus groups (Group 3) Turid says, "There's a hall with an outdoor area and a hiking area," and Markus adds, "And a forest, and it's really close to the sea, too." Turid goes on, "We have a representative from the recreation council and we cooperate with local actors that way." Markus finally completes the dialogue by saying, "The Sailing Association participated one year. Hosting activity days had been a practical way for the professionals to perform their work, foster the spread of information among users, and provide opportunities

for the practical testing and customisation of assistive activity technology. The activity days gave everyone a chance to take in both the users and the professionals' perspectives on the use of assistive activity technology. Nevertheless, variations among the Assistive Technology Centres in how activity days have been arranged have made some users more informed than others.

Applying for assistive activity technology in a way that satisfy the formal requirements for approval

A positive aspect of the organisation of the service delivery process for assistive activity technology has been its regulatory system aimed at allowing adjustments and solutions to meet individuals' specific needs. However, that dynamic has complicated the realisation of other goals, including economic sustainability and uniform service provision. As a result, knowing which consideration concurrently built into the system—personal customisation, economic considerations, or keeping uniform practice—should be emphasised has proven challenging.

Often, an application for assistive activity technology is written by an occupational therapist or physiotherapist who works for a local government and is sent to the corresponding Assistive Technology Centre for approval. Accordingly, the users reported seeking out occupational therapists or physiotherapists who excelled at writing applications and arguing in a way that would satisfy the formal requirements for approval. The requirements are that the technology should allow participation in leisure, sport and exercise [2] but would not be used for medical treatment or rehabilitation which is on another budget. Although the users have to provide detailed personal information about their need for this type of technology, the argument when applying for the technology has to be clear and easy for the Assistive Technology Centre to understand. According to one user, Gustav (59 years old), one therefore has to argue strategically in the application:

> You have to argue strategically; you have to argue the right way. You can't argue that you're going to use it [the assistive activity technology] for training and things like that, because the application will be denied right away. You should instead argue [for the benefits of] easier relocation in the local community and such things, right? To make it easier to visit people without using a car.

Gustav's explanation justifies why users have preferred arguments on applications for assistive activity technology that clearly satisfy the requirements and, at the same time, obscure their concurring interests. For example, a top reason for seeking this specific type of technology was to use it in everyday fitness training, as anyone might. Still, fitness training was associated with medical exercise, unlike social sports activities, team activities or activities with friends or family. Given that aspect of the application process, another user, Laurits (42 years old), described how the system has induced users to lie and cultivated a feeling that they have received misguided help from municipal services: "It feels unfair. You sit there, and you cannot apply yourself; you have to go through an occupational therapist. Then you need to bluff a little to get what you want. You can't be honest." From his perspective, the organisation and requirements of the service system had prompted users to give false descriptions of their current situations and to exaggerate the nature of their special needs when applying for assistive activity technology. However, all that the users have wanted is technological support that can afford them the same opportunities as others to become and stay physically active.

Lack of competence with using assistive activity technology in needs assessments

The findings in this section, primarily representing Code Group 2, showcase the difficulties of performing needs assessments for users without adequate knowledge of what possibilities assistive activity technology can afford. It also illuminates how gaps in knowledge among professionals and users have restricted users' freedom of choice in the selection of assistive activity technology during the service delivery process.

Support from the municipality and the assistive technology centre

Municipal physiotherapists and occupational therapists are responsible for discovering prospective assistive activity technology users' needs, assessing their individual situations, and preparing their applications for this technology [27]. However, interviews with users revealed that municipal services had only seldom taken the initiative to support them in applying for and testing assistive activity technology. When municipal service professionals had taken that initiative, the users had felt fortunate to have therapists who would take additional interest in their cases and possessed some knowledge about this type of technology, as David (34 years old) related:

> I've met one [municipal service professional] who was engaged more than the average one, but he was a summer substitute, and he knew me well. So, the prerequisites were completely different. Apart from that, I don't get the impression that the municipality is involved.

Another user, Janne (36 years old), described that competence among municipal service representatives related to their personal interest as professionals:

> Occupational therapists who are up to date with currently available assistive activity technology can inform us [users]. There can be big differences among them in how interested they are and how much they know about what exists and doesn't exist anymore.

Both users and professionals at the Assistive Technology Centres expressed that municipal occupational therapists and physiotherapists had little knowledge about assistive activity technology. As one of the professionals, Ingrid (Group 2), explained, "They [the municipal therapists] aren't sure, because ones who have traditionally worked with adults have little experience with assistive activity technology. Assistive Technology Centres have traditionally worked with that kind of technology." Despite having more competence with assistive activity technology than the municipal therapists, the professionals at the centres also reported differences in how willing they were to give adult users information and support when they applied for assistive activity technology. After all, sharing information among prospective and current end users and customising their devices are municipal responsibilities. Referring to his experience of extra workload when involving in direct contact with the users, Jonas, one Assistive Technology Centre professional (Group 2), said, "It's a type of application that we want to have ready on the table for assessment. The short version of this experience is that we want to have less work with these applications. Altogether, the organisational principles of the service delivery process seem to have either restricted or misallocated responsibilities within the system, which has complicated how assistive activity technology users have acquired information from the part of the system with the best knowledge about the technology.

Limited choice of assistive activity technology due to incomplete knowledge

Some users reported that the range of assistive activity technology that they had been able to choose from was sorely limited. They had not received information about all of the alternatives that could meet their needs in the context of their everyday life, which had stifled their capacity to make informed choices when selecting appropriate assistive activity technology. For instance, Arne (24 years old) recounted how he had received assistive activity technology that was not what he had wanted: "I got a device that did not fit and that I didn't want. It would break it if I tried using it." However, Assistive Technology Centre professionals countered that, in most cases, the selection of assistive activity technologys was good. As Ingrid (Group 2) explained, "The dispensation scheme covers 90% of the need, I think. Then there's that other user, who might want something else." Although the professionals believed that the selection of assistive activity technology has generally been sufficient, the users reported that they had not been introduced to all alternatives or made aware of all existing forms of ATT. Bjarne (27 years old), for instance, recounted how he had not been informed about better alternatives to the technology he had received from the Assistive Technology Centre: "There were several types of sit ski that were easier and much more user-friendly to me, but this [the assistive activity technology received] was the only one [introduced to me] because they [Assistive Technology Centre professionals] did not care at all." Bjarne's account also suggests that, from the general perspective of users, the professionals have lacked the competence about assistive activity technology needed to provide off-the-shelf solutions to meet users' needs and have not performed thorough customisations of assistive activity technology provided.

Lack of insights into the service delivery process for assistive activity technology and its outcomes

Findings from both Code Groups 1 and 2 revealed that users had struggled to understand who was responsible for providing assistive activity technology-focused support in the service delivery process, which had been especially problematic after the technology had been delivered. One user, David (34 years old), recounted not receiving what the Assistive Technology Centre ordered; extra weights to steady the wheels on his electric wheelchair front, an electronic power attachment to drag his chair. Not receiving exactly what the centre ordered had caused him to spin:

> It wasn't that strange that I was spinning, because I didn't have the extra weights that would have given weight to the front wheels and that the Assistive Technology Centre had ordered and paid for. Extra weights were not delivered, and I had no way of knowing. Because nobody was there to fix it, the error never came to light.

David's experience demonstrates how the lack of follow-up prevents users from being successfully matched with assistive activity technology, which is the chief goal of the last stage of the service delivery process. Assistive Technology Centre professionals explained that they had no protocol for providing follow-up assistance or for determining whether the technology provided was adequate and being used. In focus group 1, when asked what could have been done differently to provide better service, Anita, an Assistive Technology Centre professional, replied, "Getting feedback. That's how you get better: by getting feedback on how it [the technology] is working." However, the lack of follow-up had prevented such feedback from being received and, in turn, had made professionals at the centres unsure about the results and less able to learn from the service delivery process.

For users, it had also complicated obtaining replacement assistive activity technology if the provided devices had proven insufficient to meeting their needs. In general, users reported being dissatisfied with the process for returning assistive activity technology and with the lack of guarantees and ways to appeal allocations.

Both functional and social outcomes of the service delivery process had changed as users had learned how to use their devices. One user, Ellinor (39 years old), recounted her first year of training when she had learned to use her assistive activity technology: "I became better with using it [the technology] during that year—how to change gears and how to get the most speed without getting too tired." Ellinor's account suggests that the outcomes of the service delivery process and users' experiences once assistive activity technology is delivered are not fixed but dynamic. In that sense, the process of using the assistive activity technology is also a learning process, in which how users experience the results is likely to increasingly change as time since delivery passes.

Discussion

Weak ownership of problems among assistive activity technology users due to uncoordinated services

As the findings show, social interaction between users and professionals is vital for negotiating implications and aspects to be considered when assessing users' needs, and to create a common understanding of the users' challenges and solutions to these. Therefore, social constructionism is considered an appropriate theoretical framework for understanding what is going on in the interaction between users and professionals when assessing the needs of disabled people in relation to assistive activity technology.

In the service delivery process for assistive activity technology in Norway, users' interactions with front-line municipal services seem to be pivotal, for services at that level involve assessments of users' needs in direct contact with the users. In a user-centred approach [31], such assessments require user involvement, because they entail making decisions about whether solutions to experienced challenges are possible and, if so, then how they can be implemented. This means that social interaction – in this case between professionals and users – is important for determining how the experienced challenges are understood and negotiated. Solving the user's perceived challenges thus becomes the negotiated outcome of how the user's self-perceived needs can be met within the limits of bureaucratic priorities. In that sense, the current service delivery process seems to contain gaps in communication and competences about assistive activity technology in front-line municipal services. This might bar users from, first, becoming informed about the possibilities that assistive activity technology can offer and, second, from becoming involved in identifying problems related to their physical activity. Similar trends have also been observed in previous studies conducted in other countries, which have shown that general practitioners and case managers have limited knowledge about AT in general [12,30,44,45]. Previous studies have also shown different perspectives among users, professionals and suppliers when assessing the needs for assistive technology [22–25]. Moreover, another study conducted in Norway revealed a lack of knowledge about assistive activity technology among important actors in the field of assistive activity technology [19]. Despite that shortcoming among professionals at the municipal level, assistive activity technology users have taken the initiative to describe their needs while interacting with them.

Although professionals at municipal services assess assistive activity technology users' needs and hear their statements, when writing applications for assistive activity technology to the Assistive Technology Centres they have to describe those needs in ways that meet the requirements of the regulatory system. As a result, they can increase the likelihood that the applications are approved, which can benefit users as long as they are matched with appropriate technology. Despite the best intentions of municipal services to generate satisfactory outcomes for users, the doctoring of applications seems to manipulate the system and, in turn, to make its other parts function according to faulty premises. After all, when applications are written to manipulate the system, the coordination of "professionals working harmoniously together" comes under threat [30]. Such manipulation also complicates how actors involved work to meet the common goals of the service delivery process and hinders the creation of positive user–professional relationships. Mutual negotiations between users and professionals, where both parties contribute to understanding the challenges users face, thus appear to play a major role in forming a positive relationship and a shared understanding of the users' needs. An adjusted description of the identified problem might be understood as a kind of misapprehension of the user's situation as experienced by the user, which violates the social rules of how a fair negotiation is conducted.

Moreover, once assistive activity technology applications start to be processed in the system, the respective users cannot exert any influence on the outcome, because in the steps of authorisation and implementation [30,p.136], Assistive Technology Centres do not necessarily work closely with users or support them with information and guidance. Consequently, users' ownership of their cases weakens during the process of obtaining assistive activity technology [31].

Clearly, no one service in the service delivery process is responsible for processing a given application. Instead, different actors—the municipality, the Assistive Technology Centre, and suppliers—all with different interests take responsibility for different steps of the service delivery process. In that case, research has shown that a prerequisite for a client-centred approach is teamwork, described as collaboration by team members within and across clients, caregivers, therapists, and organisations [14]. When roles and responsibilities are unclear in that approach, the process becomes needlessly complex, complicates the accessibility of information, and lessens control over the process, especially for users [6,12,17,19]. The complexity of the service delivery process hinders social negotiations between the users and important actors that are necessary for creating a common understanding of the users' challenges as part of a socially negotiated world. The professional actors involved are working within a fragmented organisation of the service delivery process which leads to a restricted viewpoint of the challenges experienced by users.

Professionals at all Assistive Technology Centres seem to promote close cooperation with users as an important way of improving service delivery. To that end, they also seem to be concerned with so-called "process-oriented involvement" [31], the premise of which holds that involving users throughout a process affecting them can yield the best results—in this case, the most appropriate matches between assistive activity technology users and their devices. Nevertheless, organisational perspectives on who bears responsibility for involving users in that process seem to differ. Although user-centred approaches have been promoted for ethical, clinical, and economic reasons [12,30,44], they have proven somewhat impractical. In the service delivery process for assistive activity technology, the best results seem to occur when professionals at the Assistive Technology Centres work closely with users and support their competence with assistive activity technology, as exemplified by the activity days organised for users and professionals to share information and try out devices.

Information transmission and informing users

Due to its current organisation, the service delivery process for assistive activity technology in Norway does not currently provide the competence needed to inform and support users in consideration of their needs, especially during the initial stage of the process. In that context, *competence* can be defined as the possession of the knowledge and skills required to meet users' needs [30]. This study suggests that competence also includes helping users to verbally express important aspects of what they experience so they can clarify their challenges and their desired solutions.

The resulting lack of information circulating in the service delivery process prevents user involvement as well as individual customisation, because it necessarily limits the user's ability to decide whether a problem indeed exists and, if so, to define what it entails [31]. By extension, it means that the criterion of information transmission needed for user involvement [29] remains unmet in the various steps of the service delivery process of assistive activity technology.

At the same time, whereas users reported lacking information during the process of selecting assistive activity technology, the professionals indicated that the selection of assistive activity technology on offer was good, nonetheless. Such a discrepancy might be a result of the professionals' hand in managing national insurance and national insurance expenditures as well as needing to meet the national standard of products in framework agreements with dealers. If so, then the system's requirements based on functional limitations seem to divert focus from individual needs and competence, both of which should be emphasised in the service delivery process [27]. Of course, it might also be the result of assessments that prioritise medical parameters at the expense of social factors affecting individuals' needs, even though the dispensation scheme seeks to ensure the freedom of choice in the selection of AT [27,p.8].

Studies in low-income countries have shown that a fruitful strategy for promoting the equitable service delivery of AT is raising awareness among users and accommodating service delivery at the community level [46]. As the findings of the study suggest, both practices also seem to play important roles in fostering informed users and equitability in the service delivery process for assistive activity technology in Norway. As a case in point, although the social aspect of information sharing affords users already integrated in activities greater access to information about assistive activity technology, people not involved in the activities lack the same access to that information. In turn, people already participating in activities enjoy greater opportunities to become and stay active, whereas less active ones become increasingly excluded. Mounting differences in access to AT between informed and non-informed users have also been reported among AT users in Sweden [20]. Users as equal partners, seems vital for user involvement in the service delivery process for assistive activity technology. This involves users getting the opportunity to bring their perspective on the challenges people with mobility impairments face related to the use of assistive activity technology. Furthermore, it means that the users' perspective might affects which technology is allocated.

Given the service delivery process's expressed goal of finding solutions and safeguarding citizens' inclusion and equal access to AT [26], concentrating on the social aspect of information sharing might help to compensate for the lack of competence in Norway's municipal services. Social arrangements for information sharing might be especially important in the initial stage of the service delivery process to ensure informed users who can describe their needs and what might meet them [30]. At the same time, information sharing about technology implementation and management is also important at the final stage of the service delivery process to ensure that people with mobility impairments are indeed engaging in physical activity with the technology. Other researchers have also stressed the importance of sharing information between practitioners and users *via* networking, formal training, and other events [12]. As observed in the study reported here, using and practical testing assistive activity technology in the presence of other users seem to be crucial for increasing the use of the technology and ensuring the effectiveness of the service delivery process. In short, ensuring effectiveness in the service delivery process requires not only improving the competence of professionals but also promoting the networking and spread of information among users.

A need for flexibility and follow-up to get a positive practical result

As revealed in the literature, the need to test assistive activity technology under various physical and social conditions suggests the interplay of the person, the technology, and his or her surroundings influence the extent to which the technology is used [7,8,40,47,48]. Situations simulated in testing assistive activity technology should therefore resemble real-life situations as much as possible, so that the users can imagine the result of using the technology in their social surroundings and having to manage it in their everyday activities. Testing is thus not only important to forecasting the outcomes of assistive activity technology but also for its effective implementation in terms of delivery, fitting, and training [30]. After testing, follow-up becomes another vital aspect of any successful service delivery process [5,14,20,21]. Social constructionism stresses the importance of historical and structural aspects in how social phenomena are understood [34,35]. The use of assistive activity technology shows that the understanding of this technology is linked to the experience of use that changes in different social contexts and over time.

Because assistive activity technology is used under various physical and social conditions, alone or with others, and in different terrains, the outcomes of the service delivery process are both social and physical concerns. However, affording users only brief periods to test equipment prevents them from accurately envisioning the practical results of using it. In that case, the service delivery process for assistive activity technology currently fails to support users in what the so-called "domestication of the technology," the process in which technology is "tamed" by users and becomes normalised in everyday practice [49]. That shortcoming is problematic given the service delivery process's basic ethical commitment to serve users by providing them with the assistive activity technology that they require, especially because users pay a certain amount of money to obtain assistive activity technology that they expect to meet their needs. Therefore, the service delivery process should afford longer testing periods in order to allow end users to consider as many social and physical factors of the assistive activity technology as possible before its delivery. The potential benefits of doing so are increased, higher-quality user involvement due to the system's improved responsiveness to the fluctuating needs of the users that it serves [30].

Last, the final step of management and follow-up (i.e., maintenance and periodic verification) [30] is also lacking in Norway's current service delivery process for assistive activity technology, in light of findings that it has no protocols for ensuring positive matches between assistive activity technology users and their devices. By not maintaining such protocols, the service delivery process risks the abandonment of assistive activity technology by users, which is a well-known phenomenon for a wide range of AT [21,50]. As revealed by earlier studies [20], gaps in follow-up services also adversely affect the use and reuse of technology, and distribution of inappropriate technology can cause environmental problems. Whether the outcome of a given case is successful seems to coincide with both professionals' and the user's expertise with the service delivery system and assistive activity technology. Accordingly, users with the fewest assistive activity technology skills or who lack the initiative to become physically active have the fewest opportunities to get involved in the service delivery process. At the political level, the basis for user involvement seems to be in place—close collaboration between users and service providers is expected in the service delivery process [27]; however, challenges at the level of bureaucracy seem to remain. In response, practices at service and organisational levels need to be revised to ensure user involvement and provide the needed expertise about assistive activity technology among professionals.

Limitations

We will outline two main limitations. First, this study was conducted in Norway, where there are regional variations in practice at DATs. There are also different ways of organising SDP in other countries, and these variations will restrict the generalisability of the findings. Second, the municipal organisational level was not represented in the data. Information from this level may have contributed to a more precise picture of structure, competences, and user involvement in the SDP. Still, the findings are in line with previous studies, and thus there are reasons to assume that they can be generalised to other conditions

Conclusion

At all stages of the service delivery process for assistive activity technology in Norway, barriers to user involvement exist in the process of finding solutions to meet users' practical needs. For one, not providing users with the necessary information during the service delivery process renders them unable to assess their needs and to advocate for the solutions that they want. For another, the lack of assistive activity technology-related competence, especially at the municipal level, also considerably bars user involvement. No routines for follow-up service are in place, and the service delivery system has no systematic information about whether matches between users and assistive activity technology have proven successful. Moreover, the range of actors involved in the service delivery process have a corresponding range of competing goals. Some goals relate to fulfilling a professional role or professional requirements, whereas others relate to economic considerations such as expenditures and profits. Such considerations often compete with users' needs for attention and, in turn, seem to threaten the consideration of users' perspectives.

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