

Designing for Mobility

Examining how design can help improve the mobility and quality of life among the elderly

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ABSTRACT

The population of Norway and Europe in general is aging, the need for nursing per person is increasing, and the upcoming generation's physical activity level is decreasing.

There is a pressing need to find ways (such as products, services and systems) to improve the quality of life for the elderly and improve their general condition and mobility to reduce the need for nursing. Many assistive devices aim to improve the mobility of the elderly, yet they are often abandoned, not used or adopted into use later than expedient.

In this article I will examine literature regarding assistive devices, review a number of existing products and the nonuse of such products. Then I will explore how new design approaches within assistive devices and the development of these, can increase the general condition, mobility and independence for the elderly and how one can design to avoid nonuse.

An important factor found to improve Assistive Devices and the industry is argued to be communication in various forms and among various stakeholders.

KEYWORDS: Design, mobility, elderly, quality of life, assistive devices, nonuse, walker, stigma

1. INTRODUCTION

Estimates indicate that within 2060 there will be a doubling in the amount of people aged 67 or older in Norway [2]. Studies show that a significant number of the population in western countries are not physically active [11]. According to Statistics Norway, 32% of the group 67 years or older, are not at all physically active [30]. This is of great impact, both individually and for the society.

Research has shown that to not move or be physically active at all in a typical week affects your health. Lack of physical activity increases the morbidity and mortality of cardiovascular disease and type 2 diabetes, while increasing the likelihood of fall injuries [30]. It can also lead to obesity, cancer, mental disorders such as depression, and various forms of musculoskeletal disorders [30].

We know that fall injuries are one of the main

death causes amongst the elderly, and moreover it is a large part of why there is such a massive need of care services and nursing homes for the elderly [28].

Expenses regarding emergency treatment of fall accidents with elderly are high [28]. As of today a third of the communal budget in Norway is used on nursing and care, and the last few decades the average need of nursing has increased per user both in institutions as well as for those living at home [1]. Aside from the societal costs there is ailments and suffering for those affected.

The population in general is gradually decreasing the amount of physical activity [30] [13][23]. What physical state this aging population will be in when entering retirement is unknown. If the trend of decreasing activity continues, the situation will worsen. In

addition to prevention among younger people, we must find ways to improve the quality of life for the elderly. Improve their general condition and mobility to reduce the risk of falling as well as the need for nursing.

How does design, assistive devices (AD) and exercise fit into the situation?

What should future designers address in the process of designing ADs?

And how can we develop solutions that achieves the goal of improved quality of life?

This will be addressed throughout the article.

1.1 Background

After working with the elderly as an assistant in a nursing home and home care, I've seen the need to improve the quality of life in old age. Both in their own homes as well as in nursing homes.

Although quality of life is highly individualized, it can be understood as a measure of an individual's mental, emotional and physical well being, as compared with their needs and capabilities [14]. This is largely consistent with World Health Organization's definition [10].

The two most important factors that influence perceived quality of life is independence, or autonomy, and social engagement [14]. A major aspect of autonomy is of course mobility. This also influences a person's opportunities in regards to social engagements.

If a person reduces his or her mobility it may restrict the possibilities of meeting new acquaintances as well as it may complicate existing social relationships. Mobility is therefore seen as important to achieve and maintain a good quality of life.

Many ADs have been developed the last few decades to improve the fit between the demands of the environment and the competence of the elders by improving mobility. They are intended to improve the autonomy and quality of life for the elderly in a cost efficient way [24][23][7]. However, abandonment, nonuse and avoiding/postponing acquisition of these products is a problem [19]. Mobility aids (such as canes and walkers) are ranked at the top of

the list of devices "not used by choice" as well as the list "used with dissatisfaction" [19]. In this article I will explore why these aids are not used, why the users are dissatisfied and how to design ADs in a way that elders want to adopt them into use.

1.2 Method

This article builds on a literary review and semi-structured interviews. Sources are reports, research articles, web sites and blogposts regarding design of as well as use and nonuse of ADs. Some of the search terms used are "assistive devices", "nonuse", "elderly", "mobility aids", "aesthetics" etc., within databases such as oria and google scholar.

For the semi-structured interviews, I interviewed two norwegian designers about their design process when developing products for elders. The purpose of the interview was to gain insight in the design process of AD, but not for these products or interviews to be the main focus of the article. Questions asked where among others "were users involved in the design process", "if so, how and when were they involved" etc.

2. ASSISTIVE TECHNOLOGY AND DEVICES

2.1 Definition of ADs and users

There are many terms and definitions of "Assistive Devices" (ADs). In this article I will use the term "Assistive Device" (AD), to include "assistive product", assistive technology", "mobility aids", "assistive aids", and other terms that fit the following definition described by Technology-Related Assistance for Individuals with Disabilities Act of 1988. AD can be defined as <<any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities>> [20][31]. This definition includes not only products especially designed for certain disabilities, but any commercial product that may be used to aid the impairment.

Another aspect in design of AD is the wide

scope of various users or stakeholders, such as practitioners, therapists, family members, etc. In this article the use of the word “user” applies mainly to the end user, the person in use of the AD.

2.2 Use of AD amongst elderly

Among older people receiving care at home, about 80% own and use assistive devices [24][4]. A majority of the older population rely on assistive devices to a great extent in many of their routines in everyday life [14] [27]. In the US alone, there are more than 4 million people using canes and more than 1,5 million people use walkers [3].

A general opinion in the population states there is an expectancy that use of ADs will increase autonomy and is believed to have potential to substitute needed care [24].

Mann et al. carried out a study to examine assistive device use by non-institutionalized older persons, with a variety of impairments [20]. According to this study, they owned a mean of 13,7 devices each. This is a high number of devices owned and the same people also expressed the need for more devices, especially in regards to increase mobility and assist with balance. Mann et al. suggests that a reason why many elderly delay purchase of a device is because they are not sure they really need it, or that they are not sure that the device will work if they get it [20].

I have not found statistics regarding persons who would benefit from AD, but have not adopted any such AD in use. This is a difficult number to assess as the user in question might not report their physical impairment, leaving this group to be difficult to reach as well as to research.

In the context of performance of ADs, increased safety and autonomy are the two factors valued most highly by elders along with efficiency [24].

2.3 What products exist in aiding the elderly in mobility?

As mentioned, one of the main issues for the elderly is the risk related to falling [28]. Both the fear of this, which is crippling for many in itself, and of course the implications and consequences of such an event.

The fear of falling paralyzes many elders to remain seated or within their home. This reduces the amount of exercise they get, reducing their general condition which again, increases their fear and reduce the movement [18]. This is a vicious cycle which continually reduce the mobility, independence and increase the need for nursing.

There are numerous ADs which aim to improve mobility. Some examples are walkers, crutches, canes, wheelchairs, non slip mats, shower chairs, handlebars etc. [20]. Some devices combat the fear of falling and others help improve mobility.

Here are some examples of products which increase the physical activity along with mobility.

The well known walker increases the mobility and freedom of the user and offers exercise with the use. It also reduces the fear of falling as well as it provides (in most variations) a place to sit down and rest during the walk. Which is often necessary.

Another good example of this is the brand new addition, the Assistep. This product is a walker to use in stairs. Not only will it improve the mobility of the user, as it tackles the fear of falling in stairs. It helps maintain the user's physical condition because it increases the amount of “everyday exercise”.



Figure 1: Assistep in use.

A more futuristic example is the Honda Walking Assist Device.

The person using it must still be able to walk, but the robotic elements will help with the motion and stability [16]. Although the device is not in use, lease sales are scheduled to begin in November 2015.



Figure 2: Honda Walking Assist Device

Another aspect in regards to poor mobility among the elderly is mental deterioration, such as dementia. Although a person suffering from dementia may not have a poor physical state, symptoms such as disorientation, dizziness and memory loss may induce the risk of going astray [15]. This also increases the risk of falling and restrict the movement (either by choice or by institution). Because of this a number of tracking devices have emerged [25][7].

3. NONUSE OF AD

3.1 Nonuse and dissatisfaction of AD

Abandonment, nonuse or avoiding/postponing acquisition of a beneficial AD is a documented problem [19] [12].

One example of this is that many elders are reluctant to use the walker. Negative associations, the fear of being perceived as “that old” and the reluctance towards acknowledging that the health is not what it once was may cause this attitude [29] [22]. This is partly because functional ability decreases in such a slow and incremental manner, that the perceived ability is much higher than in reality [14].

Also, many perceive it as a sense of “defeat” when one must make use of ADs and postpone this for as long as possible.

They often tend to use more discreet products such as a cane rather than a walker[22]. However, in use a cane is not as stable, making it more likely to fall or become uncomfortable with the situation of walking.

Some use the ADs available as little as possible, or simply avoid walking long distances. All of this contribute to the vicious cycle as mentioned earlier.

In a study performed by Mann et al. [19], the focus was to discover what caused nonuse and dissatisfaction of AD among frail elders.

They examined which devices were owned, but not in use. The result showed that mobility devices in general were at the top of the list in both nonuse and dissatisfaction.

Eight of the top ten devices ranked for nonuse are mobility devices, with cane’s and walkers at the top of the list. Likewise, 6 out of the top 10 not-satisfied-with devices were related to mobility [19].

This tells us that existing mobility aids for elders are not satisfactory. About a third of those owned are not in use and between 20-30% of users are not satisfied with their device even though they use them. Something needs to be done in regards to design of these devices.

3.2 The main reasons for nonuse:

There are many reasons why people in need of assistive devices do not use them.

The main reasons [8] [12] [17] [19] [23] are:

Poor fit with the environment or the individual’s need.

The user’s environment is not always taken into account in the prescription of a new AD. If the device turns out to be cumbersome in use at home, say there is limited space and the prescribed walker does not fit, it will be abandoned.

Feelings of embarrassment

Many elders fear the negative associations of aging and physical decline that comes with the

use of AD [22]. They feel others will judge them and perceive them as crippled and old. Fear of drawing attention to themselves because of the AD also causes many to postpone acquisition, or even risk their own safety because of nonuse.

Lack of consumer involvement

In the commercial market, involving the consumers in the design process is normal. Since the 1980s, human centered design has been an important aspect of product development. The focus is designing for the social individual. In the production of AD, however, it seems that the focus is to design for manufacturers/medical personnel, not the user. This tendency of a “medical look” of the products, repels some users.

The users perceived lack of need

A number of studies have shown that the user does not feel the device is needed. The reason behind it is complex. Some highlight the fact that the device prescribed does in fact not suit the needs very well, others emphasize that the user does not perceive their own health and functionality equally to professionals. There is also a number of users whom understand their need, but don't find it pressing enough to want to use the device. They simply choose not to use it.

Preference for personal assistance

Surveys have revealed that users may be reluctant towards ADs if they fear using it may decrease the personal assistance. Social engagements are a key factor to quality of life, and a third of elders believe feelings of loneliness will increase when using ADs. This illuminates how important the care-givers are in the client's social life.

A lack of knowledge on how to use ADs

Not all users immediately understand the use of an AD. The devices are often complex, or used in different manners in relation to different needs. Most often the users are instructed by professionals when the device is prescribed, but the user may need a specialized introduction in how to use the device in their home environment.

Lack of awareness of the supply of ADs

Devices that would be beneficial, are not possessed by many potential users. One reason for this is that the user is not aware of the device's existence. In a study performed by Roeland et al. a significant proportion of their sample were conscious of their lack of knowledge and indicated that more publicity about ADs was desirable [23]. For instance, two thirds owned a cane, but 30% were not aware that walkers existed. These devices are highly coherent and walkers would be a beneficent device for many of the recipients.

4. DESIGNING AD

4.1 Design of AD for the elderly

With the deteriorating health following age, there is a vast amount of products designed specifically for this user group categorized within AD.

Traditionally the main criteria when designing ADs has been a functionality and usability focus. A general task and problem solving mindset [12].

In the field of ADs the development, design and manufacturing is largely done by medical professionals and engineers [26]. This is perhaps because traditionally, AD has been viewed as medical tools rather than consumer goods. The products tend to have a distinct institutional or “medical look” [21] [12].

ADs are normally introduced to the end user through a middleman, such as doctors, caregivers or government institutions [26]. As aesthetics often is used as a sales-strategy, the manufacturers might not benefit financially from designing according to the desires of the end user, seeing they depend on the criteria set by the buyers, such as health professionals. Perhaps not surprising for the phenomenon of “medical aesthetics” to appear in ADs if you consider the strong position the designer holds when developing mainstream products, but not ADs.

When designing ADs it is crucial that usability not only includes functionality and use. The aesthetics of design, identity and user

satisfaction are equally important, but apparently quite neglected issues by service providers, producers and purchase managers [21].

Many people in need of assistive devices deliberately choose not to use them [19] [21] due to perceived stigma, negative associations and experiences with AD [28] [22].

The fact is that elders rely on ADs to a great extent in many of their routines in everyday life. It is evident that the use of these have a significant impact on self esteem and emotional outlook. Therefore, one has to consider the manner in which a device is integrated into the whole of a user's life. The aesthetics of a product is in fact just as important as usability and functionality.

There are examples of grab-bars, however necessary for safety and health, looking so institutional that elders refuse to install them in their homes. This resulted in their spouse lying stranded on the floor time and time again with no means of getting up and tells us the product is in fact not at all usable.

Nor are wheelchairs that embarrass elders so much that they in some cases stop visiting friends, and hence reducing the quality of life dramatically [14].

ADs deal not only with utility and functionality, but with usability and human communication. In order to increase quality of life, reduce individual risks and reduce societal costs related to abandonment or nonuse, more research on the user's desire of aesthetics, user satisfaction and the design process is necessary [21].

4.2 Design with user involvement

The benefits from involving users in the design process are many and documented. When involving the end users early in the design process it enhances usability [5].

In regards to AD, involving the user may customize the product to fit the *actual needs*, combating the issue of a poor fit with the user's environment as well as the perceived lack of need.

Opinions related to the design from the elderly themselves, however, is never or rarely considered [9]. Still, this source is rather old, and though user involvement is not the norm when designing ADs, it's becoming more common. Here are some examples of this.

Holbø et al. has involved persons with dementia in designing a tracking device.

The current devices on the market range in two main segments. A tracking device showing the location of the person wearing it to a caregiver, and an alarm segment enabling the user to signal to a caregiver/health personnel that there is an emergency [25].

These devices are designed to be either an accessory such as a pendant or ankle bracelet, or a hidden device in the user's shoe, purse or similar items.

Both praise and opposition has met these products [7], and it is questioned *who* they are designed for. Dementia patients express a reluctance towards using them because they feel watched and monitored [15]. They lose a sense of freedom.

In a qualitative study performed by Holbø et al., the aim was to discover what these users actually want [15]. What emerged from this was that the users expressed different needs and wants. They seemed very eager to help form a device to suit their individual needs.

It turned out that the users did not want to be monitored, but wanted the device to enable them to seek help if they needed it.

From the device being designed to aid the caregivers in tracking, fitting their needs, the focus shifts to fit the users need, and aid the user in seeking help in different manners, if needed. Even so, the respondents could agree to being tracked if it was important to reassure their loved ones. Holbø and SINTEF are still researching and the end product is not yet completed (currently focusing on a smart device).

Another example of user involvement is the process behind the innovative startup of Assistep, the walker to use in stairs (figure 1 and 5). I conducted a semi structured interview

with Ingrid Lonar, the main designer behind the product. She explained a long process of involving both therapists and elders to develop the best possible product.

The insight from therapists helped them to create a prototype and tested it with users. Through qualitative interviewing and observing, they found what elements were important for them to experience safety and increased autonomy, the aspects most valued by users of AD.

The increased understanding of their users when involving them, also helped them understand what makes them feel stigmatized, what to avoid and how the product could best fit the actual needs. They found that the product had to look as light as possible yet still signal strength and stability for the user to feel safe.

The most similar product to Assistep on the market is the stairlift.



Figure 3: Example of a stairlift.

The stairlift causes many associations of disablement, and for many it feels like using a wheelchair when a walker would be sufficient. The Assistep in comparison is discreet, can be put out of the way, and replaces a rail that would be present either way.



Figure 4: Assistep as a rail in the stairs

Lonar claimed it was essential to involve potential users in order to create a product that suited their needs and wants. The feedback they received have in many ways shaped their product, which is currently in the production stage, heading to the market.

I also interviewed Carl André Nøstebø from EGGs Design. He was a part of the design team behind Topro's Troja 2G walker and many other products.



Figure 5: Topro Troja 2G.

His view is to always, in every project, get in touch with possible end users as quickly as possible. This is crucial in EGGs Design's practice. Their belief is that this helps create better products. The company has won many awards for design excellence.

One aspect he illuminated was that when in contact with elders for this particular project, they did not utter preferences in regards to aesthetics. In other user groups he found it easier to obtain opinions of what they liked, but with the Troja 2G he received no specific feedback on the matter.

There is apparently limited research regarding aesthetics preferred by elders. However, equipment with a sporty appearance was overall preferred by participants over standard medical-appearing devices in a study performed by Resnik et al. [22].

Still, what the elders read into the word “sporty” is not defined and would be something to examine before designing a product for this user group.

4.3 Design against perceived lack of need

Assuming elders will use an assistive device simply because they need it is misguided [14] [21]. Even if they are in possession of an AD, it can’t be equated with use. The psychological variables on the use of a device is expected to be stronger predictors of the actual *use* of ADs rather than the possession of ADs [23].

In the study performed by Mann et al. 30% of the respondents who chose not to use AD would use the device only if they knew it would help and it was absolutely necessary [19]. This tells us that communicating the benefits for such devices and preferably allowing the user to experience the advantages would be beneficial to enhance use. If the product can be designed in a way that is appealing to users, then the process of adopting use will be more fluent.

In our materialistic society there is a major difference between buying something because you want it, or buying something because you need it in order to function in the same extent as other people, especially younger people. It is evident that youth is sought after in our culture. Adopting products that communicate a lost youth is done with great reluctance. Postponing this process is one important reason behind the perceived lack of need.

To design against this perceived lack of need, it is therefore important to consider ways to turn the attention from the negative connotations of declining physical state to the positive aspects of enhanced physical state when using the product. How can we design an AD to become desirable? As mentioned, a desired trait in our culture is youth. If a product helps you feel younger, it triggers a profound need within the user. What causes this feeling of youth is a complex sum of what is communicated through the product.

It is a stated fact that aesthetics communicates

to the user, regardless of the designer’s intent to do so or not [26]. Also the marketing of the product speaks a lot to the consumer. Which setting the user is introduced to the product is also of importance.



Figure 5: Revitive with Egil “Drillo” Olsen.

One good example of creating something desired by the elders is Revitive. This is a product used to improve blood circulation. Although there is skepticism regarding the effects of the product, it is successfully sold in many countries around the world.

Part of the marketing strategy of this product has been to use celebrities in advertisement, and it is sold on the private market. In Norway this spokesperson has been Egil “Drillo” Olsen, a former football player and coach. His trust and respect from the Norwegian population helps endorse the product. This has had a massive influence in regards to sales and perceived benefits of use.

The aesthetics of the product fall into the category of workout equipment. With a former athlete to promote it, and focus on the health benefits (though not documented), this product has become a great success. Instead of introducing a product the users are told they need in order to function, they are introduced to a product they don’t *need*, but is said to enhance their health and is used by people they look up to. They shift from feeling forced to use it, because of old age, to want to use it because of enhanced youth.

This also supports the research performed by Resnik et al. discovering that factors to

promote greater acceptance of AD was affordable, safe, visually appealing devices with positive peer models as well as greater physician involvement [22].

4.4 Design against stigma

Associations of aging and physical decline with the use of ADs contribute to stigmatizing attitudes [22]. A well cited definition of stigma is Crocker et al.'s "stigmatized individuals possess (or are believed to possess) some attribute, or characteristic, that conveys asocial identity that is devalued in a particular social context" [6]. This is what contribute to the feelings of embarrassment mentioned in part 3.2.

Ways to design against stigma have been assessed in research and literature. A brief overview of the three most common ways found through literature is explained below.

Mainstreaming the design allows it to be assessed as consumer goods, and not be defined in the category of AD. If the products look like something anyone would want to use, it reduces the negative associations with the product. At least in the form of less visibility and less chance of sticking out in a crowd.

Age appropriateness means that the aesthetics fit the preferences of the user group intended. If the product is used in a home, it would look like it belonged there because it fits with the typical style of these people. This factor implies it is important to know the user one designs a product for.

When the product is presented to the consumer it is of interest which *product category* it is launched in. The associations of other products in this category will connect with the AD in question. Is it launched with a group of medical aids used for severe disabilities, the user will assume you must be severely disabled to use the AD in question. If the user does not feel severely disabled, the AD will not be used. If the AD is launched in a group of everyday products for an average person,

more people will feel comfortable with adopting it in to use.

TrustCare is a Swedish company manufacturing ADs for elders. Their philosophy states the importance of design for the development and improvement of ADs and their functions. Aspiring to reduce the stigma associated with ADs for elders, they are in constant contact with users and invest heavily in their design department. According to the firm, it's due to this they have obtained great success internationally.

Here is one of their products, a walker called "Let's fly". Visually it stands out from the medical tendency of AD aesthetics and provides an alternative choice.



Figure 6: "Let's fly" by TrustCare.

According to Resnik et al, if the user could select their own equipment based on their preferences for device appearance, it could improve acceptance for AD [22]. This indicates that creating options and alternatives may facilitate the user when adopting use of an AD.

5. DISCUSSION

Nonuse of ADs is a documented problem. This includes abandonment of ADs and avoiding/postponing acquisition of a beneficial AD. Mobility aids are at the top of the list of nonuse as well as dissatisfaction.

Nonuse of ADs restricts the benefits and potential positive effect on the individuals

experienced quality of life. Still, it is important to consider the fine balance between functioning as long as possible without an AD, and becoming dependent on the AD. Even though many would benefit in regards to maintaining functionality better if adopting ADs in use, many would also limit their own ability due to becoming accustomed to an AD and feeling dependent on this after a while.

The reasons behind nonuse are many and intertwined. Many users report they would only use a device if they knew it would help and it was absolutely necessary. This tells us that communicating the benefits for such devices and preferably allowing the user to experience the advantages would be beneficial to enhance use. Reasons reported as why older adults choose to use ADs are to increase safety, efficiency, autonomy, emotional security and to facilitate independence [24][8]. This is something that should be emphasized in the communication.

Introducing the AD to the user is often a task performed by Health care personnel. Traditionally the main focus has been to communicate the autonomy and mobility benefits, but it is important that they understand the need of communicating increased efficiency and safety as well. Because this is so highly valued by the users, it can facilitate introduction of ADs. Perhaps this could be implemented in the health care education to facilitate this understanding and practice. From the user's perspective, the opinions of their general practitioner and close relatives are important in regards to use of ADs. To successfully introduce an AD, their willingness and cooperation is important [24][22].

More focused studies are needed on satisfaction and dissatisfaction with specific devices, focusing on their design and features. Especially because attractive devices which can be viewed as fashion accessories may be more readily accepted [22]. What is considered attractive must therefore be examined.

Even if user involvement would be beneficial to uncover end users needs and wants, it is not

always easy to carry out. Involving elders is a complicated matter in regards to approach and ethics. Most users of AD have reduced mobility, cognitive skills and general condition. This can be problematic when seeking approval for trials or applying to practice. Also, user involvement could apply to other stakeholders than the end user as well; practitioners, therapists, family members, etc.

Even if all the stakeholders have the same goal, which is increased quality of life for the elders, their interests may differ. This is important to keep in mind when communicating with them in the design process.

What is viewed as a positive aspect in the society one is designing products for is interesting to assess. As mentioned, in the western world, health and youth are attributes much sought after. Finding out what can trigger these associations with a product would be beneficial when designing ADs. However, society changes. In a decade or two, these aspects might trigger different associations.

It is important to know the user group one is designing for and what environment they are situated in as well as what the society considers to be good or bad.

In the definition of stigma, "stigmatized individuals possess (or are believed to possess) some attribute, or characteristic, that conveys asocial identity that is devalued in a particular social context", it appears to be a fluent opinion. An attribute that previously have been devalued, might shift and be valued in society at a later stage, and vice versa. One example of this is the view of the female body.

In today's age, after Twiggy the famous model, the female body ideal is skinny, almost to the extreme. If we go back to the 50s, the female ideal was to have curves. Skinny people were devalued. Now it's opposite. This tells us that society is constantly changing. As a designer it's our job to monitor these changes, who we are designing for, and what our user is concerned with and wants. The designer's role is also important in shaping attitudes.

One challenge designers face when developing ADs, is the market segment and sales channels in contrast to consumer goods. In Norway ADs

are sponsored by the government, through “Hjelpemiddelsentralen”. This is an organization managed by NAV, the Norwegian labor and welfare management. Hjelpemiddelsentralen only lead one product in each AD category. Meaning if you need a walker in Norway, the only one you get sponsored is *the one* chosen by hjelpemiddelsentralen. The way this product is chosen is essentially based on price. The manufacturer able to produce as many products as affordable as possible wins the tender. This seriously limits the options for the user. Even if manufacturers aim to design to fit the users needs, and design products that allow choices for the user, this will not reach the end user unless the user goes against the system, and buys the product out of his/her own pocket at his/her own initiative.

Also, the process of applying and receiving the AD is time consuming. After realizing the need of AD perhaps too late already, it can take months before the user is in possession of the AD after applying.

Not all countries have such a practice. In most countries the government will not cover the entire price, but many organizations/health insurances or other stakeholders might. It is still so that there is a limited choice of options though. This is damaging in the process of enhancing use of AD. Germany has a practice of sponsoring the cheapest alternative, and leave it to the user to pay the difference if another product is preferred. This practice is much more beneficial because in many surveys the user expressed that paying out of their own pocket was agreeable, and it provides the user with options which is important.

The team behind Assistep were conscious about the tendency of ADs looking institutional or medical. They do wish to allow choices in the aesthetics of the products. However, with the inconvenient practice in Norway (especially for startups), it will complicate even a simple variation such as color choice. If the user wants to personalize the product by choosing a color, their practitioner must justify this need medically. User satisfaction in the form of aesthetics or preference, is simply not

emphasized at all. The important factor of personalizing to facilitate use is absent.

Even if we could communicate the importance of choices and aesthetics in a way that shifts the mindset of NAV, the bureaucratic system is too cumbersome to change the practice.

The economical aspect of products winding up un-used in various homes and the cost of this in regards to wasted products, increased need for nursing and reduced quality of life is important, but not assessed.

Also, it is difficult to find documentation of what aesthetics is preferred for this user group. No literature on the matter was found, and when interviewing users, it's difficult to find specific opinions on the matter.

This is something that must be further researched.

6. CONCLUSIONS

It seems there are a lot of ways to increase use of ADs and improve quality of life as a result. Not only to enhance mobility, but enable and encourage increased activity levels, health benefits and social engagements. One can improve existing products, and create new ones that are desirable for the user, more readily adopted into use, and used with improved satisfaction. Creating different options for the user, improving the aesthetics to appeal to the user group intended and communicating the benefits of improved safety, autonomy and efficiency are steps in the right direction for this market segment.

However, manufacturing satisfactory products that the user would enjoy using is not enough. It is evident that in this particular industry there is a lot of bureaucracy. It is not driven by the user's needs and wants as the consumer market is.

In order to increase use of AD in a satisfactory manner that in fact improves quality of life, It's important to get organizations like NAV in Norway to look beyond the simple numbers and cost-efficiency of which products they lead and cover the cost of. Cost-efficiency in this case is more than the price of the AD. Users

wind up not using the product. Some even feel a reduced quality of life as a result of ADs that simply does not cover their need in a bigger picture than simple functionality. If the user were able to simply cover the difference between the sponsored product and the preferred product, like in Germany, it would perhaps improve the situation.

I believe communication is the key to revolutionize this industry. Communication in many forms.

Communication to and through health care professionals, perhaps through their education. Making sure they are up to speed on what devices exist and can be beneficial, and pass on this knowledge to the user. Allowing the user to take part in the selection, and understanding how aesthetics and options is important to enhance use.

Communicating what the benefits are to the end user, “what is the point, and how can it suit my needs?” Focusing marketing strategies that go beyond the doctor’s office when the need has occurred.

Communication through the aesthetics. What does the design tell the user? This is important in regards to reduce feelings of embarrassment related to the product, and improving the fit with the user’s environment. Enabling the user with options to suit their wants and needs is important here. To do this it’s important to understand the user group and the society.

Communicating with the user. User involvement to understand who the design is

for and how to design a product that will be used with satisfaction.

And the biggest challenge I have found is *communicating to those sponsoring ADs*, that the cheapest may be the most expensive when it comes down to it. At least in the perspective of nonuse, dissatisfaction and poorer quality of life.

We don’t know what the future user group will be like. Perhaps the constant arrival of new technology and new products will cause the next generation of elders to more readily accept ADs. Perhaps their curiosity of what exists and finding out for themselves will prove useful to the use of ADs as opposed to only being introduced through medical practitioners. Perhaps the coming generations increasing focus on materialism will drive the industry towards recognizing the importance of aesthetics in ADs on the same level as consumer goods.

Either way I believe the right way for this industry to focus is more on the private market. Especially in regards to the typical ADs that are the initial ADs used. Such as canes, hearing aids etc.

It would be beneficial to examine what elder’s preferences on aesthetics are. What communicates safety, increased autonomy and efficiency to them? Emphasizing how this product can “keep them young” and not “they need it because they’re old” would be an interesting aspect for future designers to look into in the culture we live in.

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