Public space & the mobility of wheelchair users

BACHELOR THESIS

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Summary

Research was conducted to test how the public space promotes or restricts the mobility of wheelchair users. By looking at what kinds of barriers and facilitators are encountered in daily life and their impact on the mobility of wheelchair users, an assessment on public space is made. This is done by go-alongs and interviews. During the go-alongs, a gps-tracker was used to add another layer of interpretation that would not be possible via qualitative research methods alone. The overall assessment of public is space is that there are restrictions encountered on a daily basis. These restrictions were not unsurmountable but do vary in severity depending on the individual. The barriers that were encountered the most were steep ramps, uneven pavements and high curbs. The effect of these restrictions can lead to feeling unequally treated or marginalized. However most of the participants expressed that they think the public space is wheelchair accessible. The participants experienced that they can reach every destination they want, but sometimes will need assistance from others.

Contents

Introduction

Background

By 2017, all public buildings should be accessible for wheelchairs, and private businesses should make adjustments to do the same according to the government (NOS, 2016). The exact adjustments that should be done are not released yet, but supporters of the agreement were excited nonetheless, saying that this will help wheelchair users to participate in society and feel less excluded from it. However, is just adjusting public buildings enough? Public space is after all much more than just buildings. According to the Central Bureau of Statistics (CBS) half of the population will be 50 years or older by 2020. Most impairments occur later in life and it could be expected that the demographic with impairments that hinder their mobility will increase substantially. This could get even more severe because the chances of a person getting a serious impairment increase with age, especially for women (CBS, 2014). This means that we can expect a growing number of people with a mild to severe impairment participating in the public space. Research into wheelchair user's experiences of urban space is limited (Rosemary, 2007). In Meyers, et all. (2002) a study in the US is carried out to look at the experiences of wheelchair users. More specifically they looked at the experiences of the participant of reaching and failing to reach certain destinations. As well as measuring barriers and facilitators they could surmount and which were unsurmountable. The concluded that there were several destinations they could not reach. In Rosemary (2007) participants were asked about their experience with the city center of several cities in the UK. One of the conclusions was that a majority of the participants felts that they are disabled in the way these cities were planned or designed. Studies like these show the impact of inaccessibility of public space on the disabled. However in the Netherlands no scientific studies were found, by this research, that tried to assess the accessibility of public space, despite wanting public buildings to be accessible for wheelchair users in 2017 (NOS,2017).

Research problem

This research aims to assess the accessibility of public space for wheelchair users in the Netherlands. The main question that logically arises from this goal, is as follows:

How does the environment promote or restrict the mobility of wheelchair users in public space?
In order to answer the central question, several secondary questions must be answered first.

-What kind of barriers do wheelchair users encounter in the public space?
-What kind of facilitators do wheelchair users encounter in the public space?
-How does this impact everyday mobility?

Structure of thesis

In the next section the theoretical framework will be discussed wherein several key definitions and theoretical debates are summarized based on the different relevant concepts. It also highlights some relevant researches and their main results. Based on this, a conceptual model is formulated where the key definitions, theories and how they relate are visualized. Afterwards the research methods are discussed. Following this, the results are summarized and related to the theories mentioned in the theoretical framework. Afterwards the conclusions are summed up and this thesis will end with a reflection and further recommendations. The interviews guide and codes are listed in the appendixes.

Theoretical framework

First, the definitions of mobility, accessibility and impairment that are vital to this research are explained. Afterwards, a discussion on the literature about disability and public space follows.

Mobility

Mobility has been researched extensively and can be interpreted in different ways. The most basic but also often used definition of mobility, is the movement from point A to point B (Metz, 2000). Most studies on mobility are based on Hagerstrand's time-geography (1970) where travel patterns are considered to be dependent on three constraints found in space and time. Hagerstrand described the three constraints as follows:

1. Capability constraints. Limitations of the individual and/ or tools they possess. For example mobility is restricted by the time spend on sleeping and eating. Mobility is further constricted by the lack of transportation such as a car or bicycle.
2. Coupling constraints. These constraints entail where, when, and for how long a person has to join another person or object in order to consume, produce or transact. For example going to the movies with another person.
3. Authority constraints. Limitations on the space that are under control of any other person(s). For example gated communities cannot be accessed without permission (Hagerstrand, 1970).

In short activities are done to complete physiological and personal needs such as, sleeping and leisure activities, and institutional demands such as work.

Metz (2000) has identified several elements key to the concept of mobility. For this research all elements are vital to discuss. The five elements of mobility according to Metz (2000) are:

1. Travel to achieve access to desired people and places. This element is key to this research because the link between accessibility and mobility becomes clear and measurable. For instance, we can ask the participant if they were ever unable to reach a desired place or person.

2. Psychological benefits of movement. Access to certain areas can benefit social activity or person psychological health. Also important to this research. If a certain area is inaccessible it is important to research how it affects the participant.

3. Exercise benefits. This is slightly less important dependent on the participant. Someone who uses an electric wheelchair may not benefit by the exercise, but someone who uses a manual wheelchair could be greatly dependent on their physique.

4. Involvement in the local community. Similar to psychological benefits, this is about social activity which as stated earlier is important for this research. This will help to research their experiences about public space and mobility.

5. Potential travel. This is about knowing a trip could be done if wanted. This could impact the participants of this research. If the potential travel is perceived as very low, the experienced mobility is very low. Regardless if the measurable mobility is high.

Hagerstrands (1970) and Metz (2000) both have elements that see travel as a means to do something else such as travel to see other people (Metz, 2000) or to fulfill a demand such as work (Hagerstrand(1970). But where Hagerstrand (1970) only focuses on this demand Metz (2000) also highlights travel as an intrinsic value. This is perhaps most evident from point 5; potential travel. It is not about doing an activity when the individual is there but knowing that a trip could be done if he or she wanted to. The same could be said from point 2 and 3 psychological and exercise benefits of travel. It is no longer about doing an activity at the point of destination but rather about the travel itself as valuable. However this does not mean Metz (2000) is incompatible with Hagerstrand (1970) but rather as complimentary theories.

Accessibility

If one wants to assess the accessibility of public space, it is important to first define accessibility. The term is used in similar ways but depending on the definition, a whole different methodology is devised (Pirie,1979). For example, in Hakkesteegt (1993) accessibility is defined by the effort one is willing to sacrifice in order to do an activity somewhere else. But in Geurs & van Wee (2013) accessibility is defined by the extent to which the spatial-infrastructural environment allows people to perform spatially bound activities. The difference here is that the individual is central to Hakkesteegt (1993) definition of accessibility and Geurs & van Wee puts the focus on the environment as a central force to define accessibility. For this research, the definition of Geurs (2014) will be used: accessibility is about how individuals are able to perform spatial bound activities and different locations and times. Geurs (2014) explains that there are four key components to accessibility.

1. Transport and infrastructural systems. The possibility to reach certain destinations are depends on the existence and quality of infrastructural and transport systems.
2. The location of activities. The amount of available activities in a certain area influences to reach certain areas.
3. Individual traits. The access to certain transport systems and the ability to partake in certain activities are strongly determined by individual traits. These are dependend on needs, skills and capabilities of the individual. For example income, age and household.
4. Time. The availability of certain activities depends on certain times. For example most shopping malls close at 6 pm.

These four components are not meant to be viewed as four separate determents but also influence each other. For example if an individual works from 9 am till 5 pm they have less time to do certain activities (Geurs, 2014). Comparing this to the definition of mobility by Hagerstrand (1970) it is clear that mobility and accessibility are closely linked. Both concepts emphasize the individual capabilities and time as important factors towards mobility and accessibility. It is however two very different concepts. A person could be highly mobile by themselves but not every location is accessible.

Accessibility and impairment

The experiences of wheelchair users and more in general, people with disabilities, are from a theoretical perspective seen from two different perspectives the medical and social (Rosemary, 2007). The medical used to be the dominant model of interpretation for the disabled, but has lost its appeal in recent years (Butler & Bowlby, 1997). The medical definition focuses on the problems of the individual rather than society as whole. The problem therefore is the disability itself, not the environment (Oliver 1990 in Rosemary, 2007). Since its emergence, the medical model has been reviewed and has been criticized by other researchers. According to Imrie (2000, in Rosemary, 2007) this model groups the disabled into a group who cannot expect too much from society and should simply make the best of the situation. The more popular social model is almost the complete opposite, and adheres to the notion that society is the responsible actor and that it has failed to design a surrounding which is inclusive for all (Abberly, 1987 in Rosemary, 2007). The key differences between these models is that the medical model focuses on the impairment as the main reason for the restricted mobility. The social model does not ignore the medical condition of the disabled but holds society responsible for the restricted mobility. But while giving the disabled more self-worth, the social model also has its shortcomings (Butler & Bowly, 1997). The model tries to put impairment in a more complex system than just the physical, but continues to ignore that any social/political or economic factors such as education, income or even gender can influence one's mobility (Butler & Bowly, 1997). Nonetheless, for this research the social model is more fitted because it will take a critical look at the environment as a determinant for mobility, for which the medical model would be less suited

The overall research into accessibility of public space for wheelchair users is rare. Most researches of the literature focus on the experiences of the disabled, or the consequences of restricted mobility for the disabled. For example Tayor & Jozefowicz (2012) suggest that restricted accessibility has a strong impact on leisure activities. These activities are less likely spent in the city center, but rather in the outskirts of the city. This does imply a certain relation with accessibility and spatial behavior. Another case study used daily telephone interviews in conjunction with questionnaires, to research if wheelchair users could reach daily destinations, and measure how often barriers and facilitators were encountered on the way to their destination (Meyers, et al. 2002). The barriers and facilitators were grouped into three categories: environmental, internal and interpersonal. The study showed that a substantial destinations could not be reached due to environmental barriers (Meyers, et al. 2002).

Conceptual model

To visualize the theories and concepts discussed above, a pyramid was used to display the hierarchy. The barriers and facilitators encountered along the route and at the destination will determine its

accessibility. The mobility of a person will be influenced by the accessibility of the place where the spatial activity takes place. These factors should help to assess the accessibility of public space. This will help to determine how the public space promotes or restricts the mobility of wheelchair users.
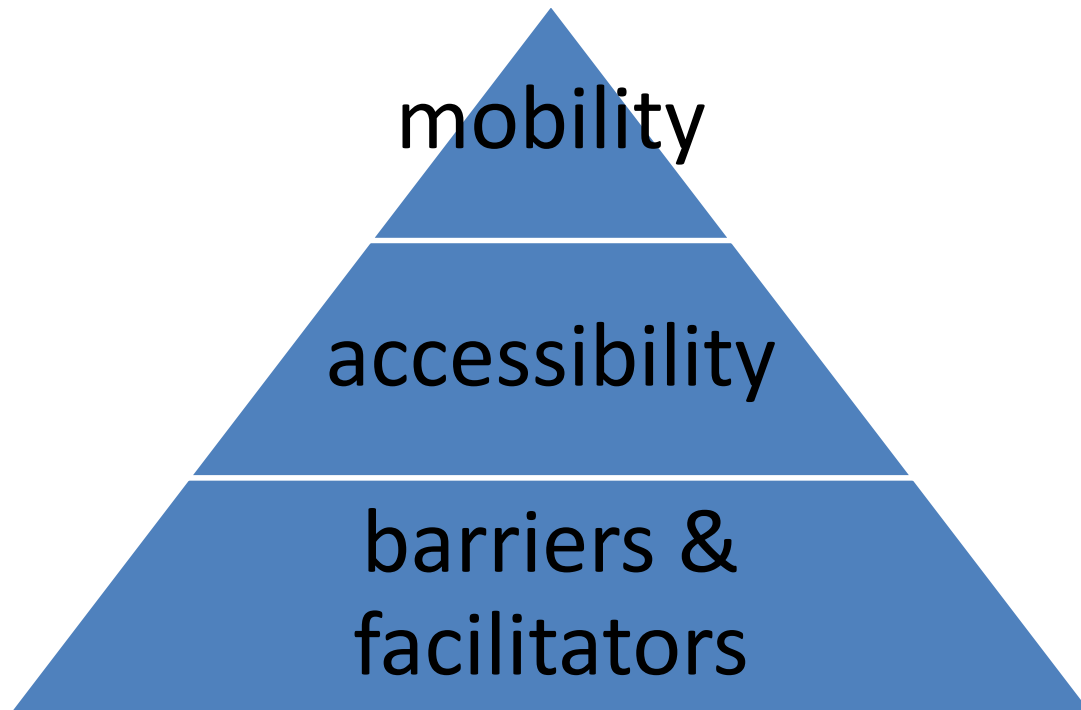
Hypothesis

Based on Meyers et. al. (2002) research, the hypothesis is that most facilitating variables will be of an interpersonal nature meaning that other people will have a higher impact on the participants then the built environment.

Methodology

The methodology section will start with a discussion of the methods used. In the discussion the benefits and limitations of the research methods are highlighted. Afterwards the process of data collection is described. This will be followed up by a paragraph on the participants. Ethical considerations and data analysis will be discussed at the end of the methodology chapter.

Discussion of the Methods

To identify wheelchair user mobility in public space, go-alongs with GPS trackers and interviews were conducted. The GPS tracker provided additional support via visual aid to illustrate where the obstacles and facilitators are encountered. The data was visualized in ArcMap, and several maps was generated (see figure 1, 2 and 3)

Go-along is a qualitative, participatory research method whereby the researcher interviews the participant whilst on route. The go-along can be carried out as a walk-along or a ride-along or a mixed version combining the two types (Kusenbach, 2003). Go-alongs are useful to show habitual relations with the surrounding, in this case public space, because it exposes environmental perception and spatial practices (Kusenbach, 2003). In Hitchins and Jones (2004) walking interviews helped participants to better communicate their feelings and viewpoints when they are at the place they were questioned about.

In this case the participant have chosen their own route in order to experience their everyday mobility. This allows the participant to contribute to the research in an active way instead of merely being on object of research (Clifford et. All 2010). Similar to the walking interviews, in the thesis of Lager, D (2015), go-alongs are carried out to get a detailed and precise understanding of the participant's experiences of their mobility in public space. The go-along also provides an insight in what types of barriers and facilitators are encountered, how often they are present on a given route and how impactful they are on mobility. There are several limitations to the go-along. The go-along is for example, a demanding research method. The go-along requires the researcher to observe the participant, observe the surrounding, interview the participant and have some method of recording the information. This could easily lead to losing the quality of interview. Walking or driving and listening to the participant while also being able to have follow up questions and pay attention to the environment is impossible to do without compromising one or several of these elements (Evan & Jones, 2011). Another limitation is that the go-along is only a snapshot of the daily mobility of a person. Although participants verified that the go-along was not different then their daily routine, several go-alongs should be conducted per participant in order to create a clearer understanding of their everyday mobility.

In order to deal with the limitation of the go-along semi-structured interviews are also conducted. With semi-structured interviews several questions are prepared in advance. However participants are allowed to explore issues they feel are important (Clifford et. All 2010). Semi structured interviews are useful for investigating complex behaviors, opinions, emotions and for collecting a diversity of experiences (Clifford et. All 2010). The interviews grants an opportunity to follow up on subjects raised during the go-along but that did not have the time to explore. Besides this the interview can explore the experiences about mobility in public space in a more general sense. Instead of the go-along that is mainly about the route that is taken at that time. It is important to note that the information gained are

insights into experiences and opinions but not facts. One may have unpleasant experience with a place but that does not mean that place is unpleasant for all.

In addition to semi-structured interview, GPS trackers are also used. The purpose of the go-along is to gain insight into the experiences of mobility in the public space. In other words the relationship between the participant and the environment, public space, is researched. Mapping the data would offer another layer of interpretation(Carpiano, 2011). In Pink (2007) video is used to provide spatial context. However this would only increase the limitation of the go-along adding yet another task to be done while interviewing. That is why GPS trackers are used. The data is visualized using Arcmap see figures 1,2 and 3. Not only will this show the routes taken but also the speed at which the participants are traveling. This is used to elaborate the difference between the capabilities of the participant.

The mixed methods approach including both qualitative and quantitative methods can open up new insights that either methods could not create individually. Much like Weitkamp & Meijering (2016) the mixed-method approach can enable researchers to see how GPS measured mobility differs from self-reported mobility.

Data collection process

In total ten go-along were carried out followed by 10 semi-structured interview. One interview was done during the go-along because the go-along was long enough to conduct both the go-along questions and the interview questions. The routes were chosen by the participants and therefore differ in length and place. The shortest go-along was 14 minutes and the longest took 59 minutes. The participants stated that all the go-alongs external conditions such as traffic, weather and time of day were mostly the same as normal. This was asked in order to ensure the experience was as close to every day. The semi structured interview were done immediately after the go-along. This was done so the memory about the go-along is still fresh and the participant will mostly likely not forget anything. The semi-structured interview helped to explore other routes that were also taken daily. It also helped to gain a more general insight into mobility and public space. Several topics such as public transportation and public bathrooms that were not taken into account by the research beforehand were raised by the participants themselves. The go-along as well as the interview were both audio recorded in order to be transcribed. The GPS data was also successfully recorded and inserted into ArcMap.

Participants

The most difficult part of the data collection process was finding participants. This is in part because the research is about a relatively small population. Another reason was the reluctance of organizations allowing students on their premises. Two participants were recruited via social media. Note that these participant or any other participant had no direct prior relations to the researcher in order to maintain the integrity of the research. One participant was recruited by another participant. Four participant came from a sports organization. The remaining four were encountered within the city of Groningen and asked to participate. This resulted in 10 participants, 7 males and 3 women, who differ in age, physical ability and living area. For example 6 participants used an electric wheelchair, while three used manual wheelchair and one participant who used a manual wheelchair with electric support. The participants age ranged from 18 till 53.

Ethical considerations

During the go-along and interviews sensitive information is brought up which might embarrass or upset the participant if this would ever to be traced back to them. For example some participants recall times where they were stuck and could not move until someone helped them. But there were also more tragic stories about how they got a disability. Therefore, participants were guaranteed anonymity. To this end, transcripts were anonymized and sensitive information was left out.

Data analysis scheme.

All the go-alongs and interviews were transcribed. For the purposes of this research all the quotes were also translated from Dutch to English. The first set of codes were created based on the theoretical framework. This is called deductive coding. Afterwards several codes were altered and added based on the transcripts. This is called inductive coding. By using deductive coding data that is directly related to the theories, described in the theoretical framework, are highlighted. Inductive coding will highlight themes that arise from the participants. By balancing inductive and deductive coding the least amount of relevant data is lost. However the data is coded by one person which will give consistency in the coding but will fail to provide a broader perspective that only multiple researchers can provide (Fereday & Cochrane, 2006).

Results

The results section will be discussed via the conceptual model. First an overview of the mobility of the participants are given. Then several aspects of mobility are discussed based on the literature. Then the barriers and facilitators are discussed.

Mobility

All the participants said they either used their wheelchair, taxi or own transportation as means to get around. The reason public transportation was hardly ever used was because of negative experiences. Participant 6 said that the bus stop near him was not adjusted and was therefore hard to reach. Most participants stated to have had, or heard of very negative experiences of public transportation. For the bus several participants stated that it is not uncommon for bus drivers to keep driving if they see someone in a wheelchair at the bus stop.
Participant 6 even said that he had to explain to the bus driver how to open the latch in order to let wheelchair users in the bus:

''Sometimes I will go to Emmen or Emmeloord. The busdrifer did not even know how to do it. I had to explain to him that there is a button near his steeringwheel. Then I had to open the latch with the remote. Even worse when I opened the latch I saw that everything was filthy and dusty.'' [participant (6)]

Other participants said that it is also unreliable because some busses are full and then they have to wait for the next one. When asked about the train as a means of transportation, the participants gave mixed responses. Some are just glad they can make use of the train whiles others have negative experiences with it. In order to use the trains of NS someone must call one hour in advance to let NS know. That way someone will bring a ramp. However this does not guarantee admission to the train because the train can be full. This happened to participant 9:

'' I think it's very inaccessible. Last January I went to Utrecht with some friends. We had asked NS to help me get on board the train. The man who is supposed to help was there on time but the train operator said the train was full and we could not board. If the other person had not ignored that and put me on the train any way I would not be able to travel on time. That means all the other transportation I arranged to pick me up would not have been there on the right time either. And when we got there in Utrecht it turned out that a extra carrion was added to the train in Zwolle. That meant that the person who would help me off the train was at the wrong carriage because the number of carriage was off and they did not tell the person who was going to help me. Fortunately there were other people who could look for me because I couldn't get off the train. And another thing was that I had to stand next to the toilet. But I could not move because it was too crowded in the train. That meant that no one could use the toilet..'' [participant (9)]

This quote shows the unreliability of the train. This is particularly inconvenient as the participant relies more heavily on the reliability of the train than an average person. This is because further transportation also has to be taken care of in advance, this results in a tight time schedule. Calling the NS and arranging subsequent transportation means that traveling, at least for participant 9, requires more planning. These experiences align with Rosemary (2007) where wheelchair users reported the public transportation to be unreliable. Because of the unreliability of public transportation private transportation is mainly used for longer distances.
Therefore parking spaces are significant factors that contribute to wheelchair accessibility of public

space. Participants who relied heavily on private car as a means of transportation were asked what they thought of parking spaces. The results were mixed. Out of the four participants two stated that the amount of handicapped parking spaces where fine and the other two said it there are too few. The majority did say that handicapped parking spaces where too small which resulted in them not being able to leave the vehicle or at least having some difficulty doing so. This is in line with Rosemary (2007) where wheelchair users also found it difficult to find appropriate size parking spaces but only in the city center.

The potential travel of the participants is high seeing as no participant believes they ever encountered a situation where they could not travel to within in the Netherlands. However participant 7, 9 and 10 described that they cannot just simply go where they please. They have to explore the route and destination first in order to verify if there handicapped friendly bathrooms and entrances. Participant 9 also explained that pick up and drop of needs to be carefully planned. For the caretakers of participant 10 this results in choosing destinations that are known so that they possibility of unknown problems are minimalized. Due to problem areas such as the inner city and cafes it can be difficult to maintain social contacts.

 '' Yes you go out less and have less social contact. That is disappointing but I get why. But it is still disappointing.'' [participant (3)]

However this does vary from person to person. Participant 8 also experiences the limited accessibility of the cafes however he still goes out regularly.

Participant 4 also told about instances where new constructions where build but where not adequate adapted for the handicapped. *"(..)Look they just dont think about it. We are too small a group to means something. (..) Then I think to myself; Why do you exclude people ?''* [participant (4)]

These quotes show that the participant to some degree feel marginalized by the inaccessibility of public space.

Barriers

Most participants stated that barriers are more an inconvenience then an obstacle that must be overcome. The general opinion of the participants about public space was positive. Especially compared too other countries. Only two participants has a negative view of public space. In fact all of the participants stated that they have never experienced a situation that they could not reach their destination except for in amusements parks. However they have encountered situations that they could not get there on their own but with the help of their attendant or companion.

All the participants were asked which barriers they found the hardest and which ones they encountered the most. All participants answered that one of the hardest things where hills that are too steep. This is mostly a hindrance when entering a building but this was also encountered throughout cities. Another obstacle mentioned was the type of pavement. All the participants preferred asphalt to brick roads because the brick roads are uneven and can cause some nausea if placed unevenly. How much the pavement influenced the participant seemed to be correlated to their own condition. For participant 4 for example even small cracks in asphalt were a hindrance that she tried to avoid. While participant 2 and 6, who are athletes, brick roads are only mildly annoying because it forces them to slow down for an example of this see figure 3. Participant 6 also mentioned that smooth brick roads are dangerous, because when the road is wet their stopping distance is increased which can be dangerous. These factors, pavement and steep hills correspond with the findings of Meyers, et. all (2002). Although none of the participants could recall a situation that they could not overcome, there were also barriers that where more impactful for some of the participants then others, confirming Meyers et all, that there are no absolute barriers but different barriers for different users.

Another barrier that has not been named in neither Rosemary (2007) and Meyers et. all (2002) has been construction work. Due to contraction work roads are sometimes left open leaving a road filled with sand.

‘‘No with sand and everything else that is not going to work. Something I can get around it but when I am standing there I just think I am not going to try that. Because if I get stuck it becomes a whole thing and I don't want that. I always think before crossing such things. Safety is important to me so I really think about it.''[participant (5)]

On top of that participant 3 explained that the plates construction workers lay out in order to cross the road are too high and that her wheelchair cannot get on it. Finally high curbs or ramps that were listed as barriers. This was confirmed by observation during the go-alongs. High curbs and steep ramps prevented participants from using the sidewalk and instead prompted them to ride on the main road. During the go-along of participant 9 a steep ramp forced her to cross the road earlier and ride on the grass. During the go-along of participant 4 a steep curb forced her to slow down to gently cross the road. A car riding on the road stopped rather late getting quit close to the participant. Participant 4 commented that she first has to focus on getting of the pavement and then can switch her attention to watching other traffic.
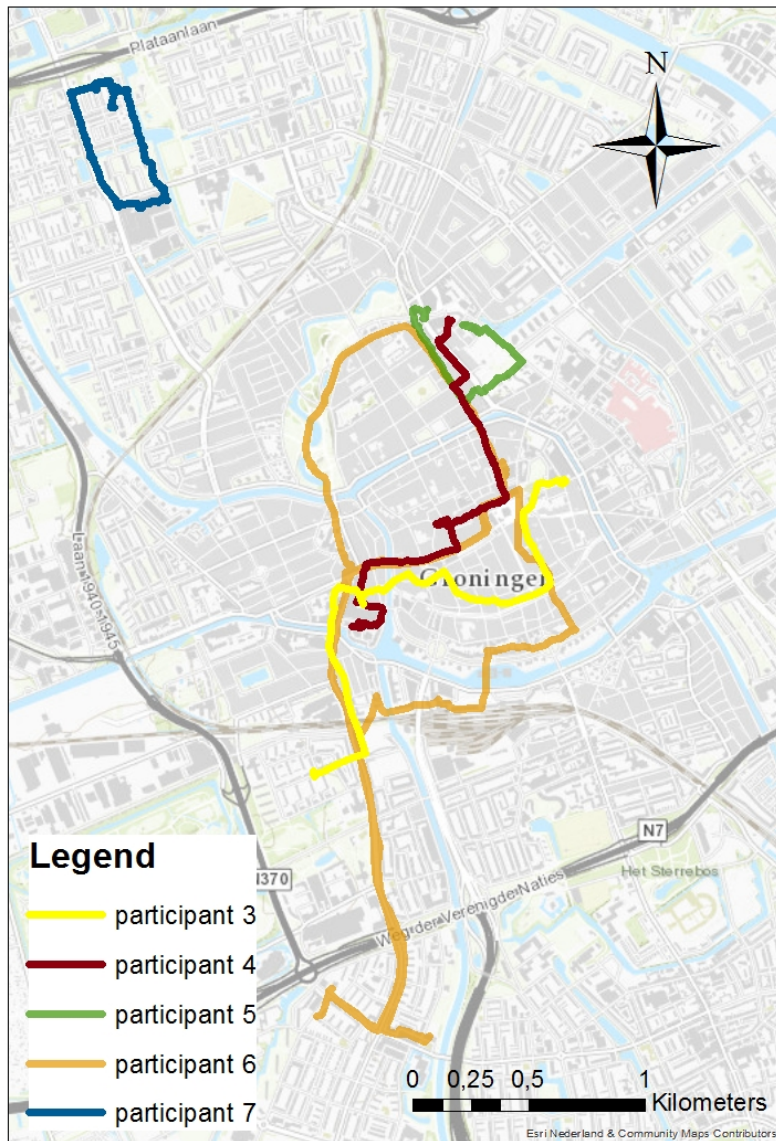
Figure 1 Go-along routes Groningen (Source: GPS data & ArcGIS)

In Figure 1 above the routes of the participants are displayed within the city of Groningen. The biggest route that has been traversed, was with participant 6, near Corpus den Hoorn going through the Schildersbuurt and Noorderplantsoen going back via the city center. Because this was the longest route taken and several other routes overlapped, another map (figure 2) was made to highlight the route and show some of the barriers encountered. Schildersbuurt and Noorderplantsoen going back via the city center. Because this was the longest route taken and several other routes overlapped, another map (figure 2) was made to highlight the route and show some of the barriers encountered.

Figure 2 Go-along route 6 (Source: GPS data & ArcGIS)

During the route, the participant showed, in the City Park called Noorderplantsoen, that there are some hills that are very steep and are hard to pass if you do not have a very good physical fitness. Even if one has this, the sand on the road causes the tires to spin which makes you lose grip. This is especially dangerous on the way back down because it is close to a body of water. The other picture in figure 2 is a snapshot of the pavement in the Brugstraat. This road has been crossed with several different participants and was generally experienced as unpleasant. The pavement is narrow as is but is even further narrowed by the parked bicycles often making that sidewalk not passable via wheelchair. The sidewalk is also considerable higher than the road making stepping on and off the pavement difficult.

During the interviews all participants where asked if there is a part of the town or city where they live that is less accessible and why. Eight out of ten participants said that the center of their town/ city was more inaccessible. This was due to business and that the center is usually older and less adapted to the needs of wheelchair users. In particular lack of a public toilet is seen as very negative. Activities such as traveling to another place or going out for a drink is difficult when there is not a toilet nearby. Another area that was often cited were areas where cafes, pubs or other business that served alcohol centered. This was mainly due to the entrances not being adapted making entrance to cafes impossible without help.

''Yes, in fact just recently i was in Leeuwarden. I had to go the toilet. They have an handicapped spot in the MCdonalds. However first I have to get down a long set of stairs. I cannot do that ! There is almost no handicapped toilet in Leeuwarden.'' [Participant (8)]

Participants have all said direct of indirectly that other participants in the public space are more influential than the build environment. This partially corresponds with the findings of Meyers et al. (2002) that interpersonal factors can be very influential in the daily mobility of wheelchair users. Other people can present barriers in various ways. Big crowds are sometimes avoided resulting in daily activities being done on times when it is least busy. However most participants say that they do not let big crowds bother them to the point that they avoid big crowds. But other people can also present barriers in a more indirect way. Parking the bike on the pavement in way that it is impossible to use the pavement (see figure 2), parking the car that obstructs the view making crossing the road more dangerous, containers and shop boards on the pavement narrowing the pavement that makes it hard to pass through are all different examples of how they present barriers. For participant two some holidays means staying inside as a result of the crowds.

Facilitators

Environmental elements that helped the accessibility of public space where mostly the opposites of elements that were listed as problematic. Meaning flat smooth roads, preferable asphalt and broad sidewalks. Although not specifically mentioned during every interview dropped curbs seems to be important. This is important in order to go to a store or move aside when the pavement is too small or crowded. As mentioned before other people can present barriers in many aspects. It is also important to note that participants say that most persons are willing to help if you point out that you need it. When asked if he thought other people are more helpful or troublesome participant 5 answered:

'' More helpful. It depends on yourself. If you are too afraid to ask for help then it's your problem. People don't mind to help you at all.'' [participant (5)]

People can help in different ways such as opening doors, pushing when someone gets stuck or just stepping aside.
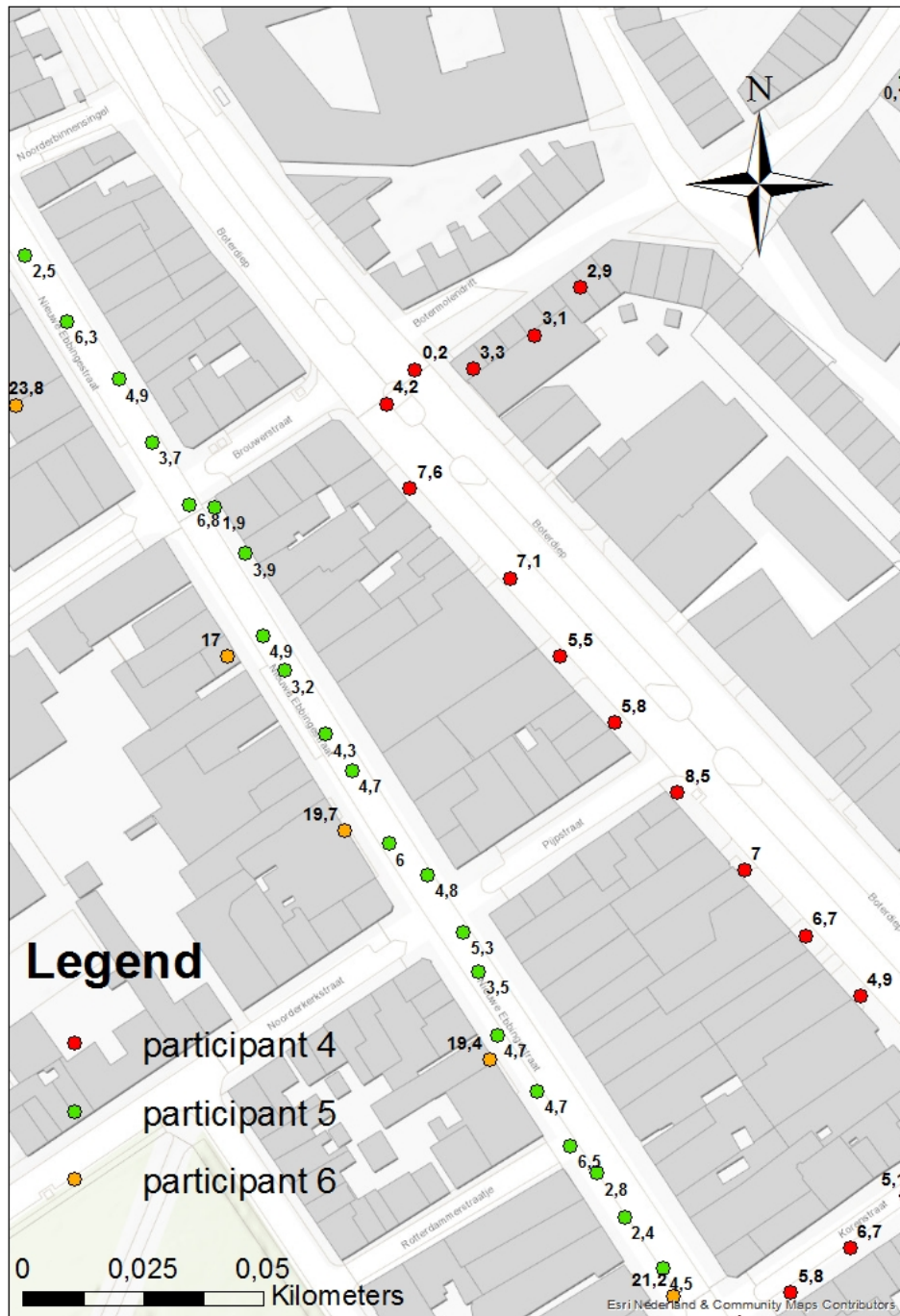
Figure 3 average speed per point per participant (Source: GPS data & ArcGIS)

To highlight how barriers and facilitators can affect the participant in various degrees another map (see figure 3) was made showing the overlapping parts of the routes of participant 4, 5 and 6. The go-along of participant 4 and 6 were done on a bicycle and the go-along of participant 5 was done on foot. Every point shows the average speed in meters per second per participant. It becomes clear that participant 6, who uses a manual wheelchair has almost no trouble navigating through the street going as fast as 21, 2 meters per second. Participant 4 and 5 who both use an electric wheelchair are first off bound by the speed limit by their wheelchair. Secondly the barriers such as uneven roads are more impactful making their average speed much lower.

Conclusions

The aim of this thesis was to assess the accessibility of public space. In order to do this several interviews and go-along where conducted in order to ascertain what kinds of barriers and facilitators where encountered on a daily basis. During the interviews the effects of these barriers and facilitators where questioned in order to understand the effect they might have.

Despite the differences between the participants the barriers and facilitators encountered did mostly correspond. The environmental barriers encountered are uneven pavement, high curbs, small sidewalks and steep hills. Other people can presents themselves as barriers in different ways. Big crowds are seen as annoying making the route difficult. More indirectly bicycles, containers and parked cars can narrow the pavement to a point that it is not possible to travel along that pavement. These individual barriers are easily surmountable but can annoying especially when several barriers are in the same area.

The facilitators encountered were the same for every participant namely smooth pavement preferable asphalt, low curbs and or ramps that are not too steep. Other people are also seen as helpful when the environment presents a barrier. This can range from opening a door or pushing a participant up an hill.

The effects of barriers differ per participant mainly due to their physical condition. In the mildest cases the barriers forced the participant to slow down a bit. But this can vary greatly depending on the individual, see figure 3 for an example. But these barriers can also have a bigger impact prompting participants to use the main road, have less attention to other traffic or having to use a different path. According to the participants these barriers where mainly found in the center of the city or village. This is because the center is usually older and less adjusted to suit the needs of the handicapped. Construction work can also present all the previous mentioned barriers making roads inaccessible. The potential travel within the Netherlands is great as none of the participant feel that they could reach every destination here. However spontaneous travels are a lot harder. Activities such as going shopping to a different city require research in order to verify that amenities are available. Especially when private transportation is not available. The public transportation is unreliable making a trip more difficult than it needs to be. Facilitators although les mentioned by the participant can also have a big impact. Despite all the barriers mentioned above all the participants felt they could reach every destination but would sometimes need help from others.

Overall the accessibility of the public space was evaluated as good by the participants. This is because the barriers presented during every day activities are relatively easy to overcome. The effect of the barriers & facilitators differ from person to person due to their own physical fitness. These barriers and facilitators are encountered several times on a daily basis. However these barriers are most of the time relatively easy surmounted. But those that are not so easily surmounted can have serious consequences. Some feel that they go out less and have a more difficult time seeing friends. Others can sometimes feel unevenly treated or marginalized. However because these more difficult barriers are encountered less and other barriers are surmountable, wheelchair users attitudes remain mostly optimistic and confident. Nonetheless public space should try to promote the mobility of wheelchair users in public space more.

Reflection and limitations

The research into the accessibility of public space for the disabled has, certainly on a national level, has been minimal. By combining qualitative (interviews, go-alongs) and quantitative (GPS) research methods new insights were gained that was not possible otherwise. The go-along sometimes created more information than the interview because the participants were confronted with barriers and facilitators instead of trying to remember them.

However this research still has several limitations. It turned out to be difficult to find places where it was allowed to ask participants if they are willing to participate. Formal ways such as emails and phone calls where mostly ineffective. Most participants were found by accidently running into them on the street and asking them for more participants. Because of the diversity of wheelchair users it was difficult to find barriers that impacted everyone. Besides this the research focused heavily on the barriers and not enough of the facilitators. This was partly due to that participants found it easier to talk about what was annoying than give examples of a place that had improved and how it exactly facilitated their mobility. Unsurprisingly it is easier to remember a time when something was difficult than times that it went smoothly. The GPS tracker was accurate but sometimes has coordinates that were moved slightly then were the route had actually taken place. A participant might appear to be on the street adjacent to the street they had actually taken,

Implications for further research

During the interview a lot of topics came up that could present interesting avenues for further research. Most participants felt that the entrance to buildings present a bigger barrier that is more often encountered then barriers in public space. Other research could focus on how to create facilitators that have a lasting effect.For example the effect of lower curbs on self-reported mobility of wheelchair users. On. Research on cooperation between wheelchair users and city planning or designing in order to promote mobility for all. For example shopping is difficult in the city of Groningen. Most of the stores are not wheelchair accessible.

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Appendix

Interview & Go-along transcripts

Interview guide

During the walk along the observer will have several objectives:

-Take note of barriers/facilitators and where they are so that they can be placed on a map in GIS.

Taking note of all the barriers and facilitators that are encountered are vital to answer the main question. It is possible that a whole list of barriers and facilitators are encountered and that they should be categorized in order to better handle the amount of data and make conclusions based on the data. In conjunction with the GPS tracker it will possible to place these barriers and facilitators on the map the easily show the route and where barriers and facilitators are.

-How much effort does it take to overcome the barrier?

This will help answer the third secondary question. Observing how much effort the participants must use to overcome the barrier will help understand how much this impacts their life's. The same could be said for a facilitator. But this is harder to observe because there is no point of reference to see how much the facilitator helps other than the recollection of the participant.

-How do other people interact with the participant? E.g are they barrier or facilitators?

Based on Meyers et all (2002) human interaction could be an important factor of the mobility of wheelchair users. People could present themselves as barrier for example: not moving out of the way, cutting in front of the wheelchair or not helping when a environmental barrier is encountered. Other people could be facilitators by helping the clear the path.

-How does a obstacle or facilitator appear to affect the participant?

    -Do some invoke more response than others?

This could be useful to remember when conducting the interviews. Some barrier or facilitator could perhaps be more humiliating then a physical barrier and therefore invoke a stronger response. If this is the case the wheelchair user could alter his spatial pattern in order to avoid these barriers and facilitator.

-Listen to the participant.

The most effective way to see how all the barriers and facilitators effect the participant's mobility is to listen to what she or he says when they encounter it. However an interview will be conducted afterwards to delve deeper as to how this effects the participants. Therefore there will not be any follow up questions but rather just listening to what the participants already tell themselves.

Interview.

The interview will take place after the walk along in order to question the participant about the walk along. The interview will also be about the experience in the public space of Groningen in general and not just about the walk along. This is done because the walk along is still just a short portion of the total time of the daily spatial behavior of the participant. The interview will be held directly after the walk along so that the events are easiest to remember. However this will mean that it will take a lot of time of the participant and this may make it hard to find participants that are able to partake in the research. Therefore it will be allowed to take the interview at a later moment if need be. But is should be done as close as possible to the walk along.

Leg uit wat het doel van het onderzoek is, geef voorbeelden van barriers; hoge drempels, te smalle stoep etc en facilitators; vlakke wegen, asphalt ipv oneven stenen. Leg ook uit dat je graag wilt horen of het moeilijker of makkelijker is door andere deelnemers in het verkeer.

Leg ook uit dat de participant tijdens de go-along dingen moet aanwijzen als hinderlijk of bevordelijk omdat het voor iedereen anders is en ik niet weet wat hij/zij vervelend of positief vind. En dat hij/ zij dit maar kort hoeft te doen en dat we tijdens het interview er wel dieper op in kunnen gaan.

Introductievragen

Hoe lang zit je al in een Rolstoel ?

Hoe heeft dat je verplaatsingsgedrag beinvloed ?

Indien altijd :

Is het nu makkelijker om je te verplaatsen dan vroeger?

In hoevere heeft je fysieke conditie daar effect op?

Vragen over de go-along

Hoe vond je de go along gaan? Is dit typisch voor hoe je je normaal beweegt?

Ga je normaal rond dezelfde tijd ? Is het dan rustiger of drukker op de weg ?

Maakt dat het lastiger of makkelijker?

Welke obstakels vind je het lastigst? Waarom ? Hoe ? Wat doe je dan ?

Wat vond je behulpzaam om je te verplaatsen

Dieper door gaan op deze elementen als er wat genoemd word, was de verkeerssituatie altijd al zo? Wat zou je er aan veranderen, hoe kan het nog beter etc.

Heb je het idee dat de ruimte ook is ingericht voor mensen in een rolstoel ?

Vragen over de publieke ruimte,

Hoe lang denk jij dat jij in je rolstoel per dag deelneemt in de publieke ruimte ?

Verschilt het per dag ?

Welke plekken kom je het vaakst ? Wat doe je daar ?

Hoe reis je daar naar toe ? Bus, auto etc en alleen of samen?

Wat kom je onderweg dan tegen waardoor de reis lastiger of makkelijker word?

Kun je een voorbeeld geven hoe het ergens anders beter is of slechter is?

Verschilt het per dag hoe moeilijk of makkelijk het is om ergens te komen ?

Hoe komt dat ?

Welke obstakel kom je het meeste tegen ?

Zijn er activiteiten moeilijk te doen doordat ze moeilijk bereikbaar zijn ?

Zijn er wel eens plekken geweest die simpelweg niet bereikbaar zijn ?

Zijn er ook obstakels waar je hulp moet vragen van andere mensen?

Helpen mensen vaak uit hunzelf of moet je er om vragen ?

Hoe beinvloeden andere mensen je verplaatsingsgedrag ?

Is er verschil tussen stad en platteland in bereikbaarheid ? Waarom wel waarom niet?

Vragen over positieve elementen

Wat zorgt ervoor dat jij je beter kan verplaatsen ? Inrichting wegen stoepen etc?

Wat vind jij het meest behulpzaam ?

Wanneer kom jij deze dingen het meeste tegen ? In de stad ? of naar een bepaalde activiteit?

Is het nu beter dan vroeger ? Waardoor dan ?

Afsluiting

In het algemeen, ben je tevreden over de rolstoeltoegankelijkheid van Hoogeveen ? en in NL?

Is er een verschil tussen Hoogeveen, grotere stad, kleiner dorp?

Wat zou jij het liefst aanpakken ?

Coding Scheme and transcripts.

Although explained in the thesis it is important to note that some parts of the interview and or go-along may be altered or scrapped to protect the anonymity of the participant. On top of that some parts of the go-along are not transcribed when it was deemed to be unnecessary for these research purposes. Of Course this was kept to an absolute minimum. Other parts may be incomplete due to external noises. Coding scheme:

Bariers
Facilitators
Impact of barrier
Impact of facilitator
General opinion about public space.
Change in time
Human effect
Problem areas