Institute of Transport Economics
Norwegian Centre for Transport Research

Universal design in transport

Editors: Nils Fearnley and Kjersti Visnes Øksenholt

Preface

The current literature on universal design has so far failed to fully address the challenges faced by transport agencies, and when the planners lack holistic knowledge, the solutions that are developed will not meet the required standard.

The aim of this collection of articles is to contribute to increased overall knowledge about what universal design and accessibility for all entails, and also the principles of how accessibility for all can be achieved in a transport context in terms of the planning process and physical solutions. In this way, the articles will contribute to the realisation of universal design, and thus promote a better quality of life and equality for people with disabilities.

The collection of articles is a topical reference work on universal design for various study programmes, fields of study and postgraduate courses in the higher education sector, and for transport agencies and planning authorities.

We would like to extend a big thank you to Liv Øvstedal and Stein Brembu at the Norwegian Public Roads Administration, who initiated and partly funded the articles, and to the Norwegian Directorate for Children, Youth and Family Affairs (Bufdir) who partly funded the collection through their grant scheme 'Universal design – knowledge development, skills development and information'. A big thank you also to Tanu Priya Uteng from the Institute of Transport Economics (TØI) who took on the role of substitute editor for the first article in the collection, which was written by the editors. And thank you very much to Hanne Sparre-Enger from the TØI's Department of Communication, who edited the texts and led the work on layout and design.

Finally, we would like to thank the anonymous reviewers who have peer reviewed all the contributions. The authors and editors agree that their close reading and thorough feedback have greatly improved the articles.

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A collection of articles: Universal design in the transport sector

The aim of this collection of articles is to contribute to increased knowledge about what universal design and accessibility for all entails, as well as principles of how accessibility for all can be achieved in a transport context in terms of both the planning process and physical solutions. We want the collection to strengthen universal design, and in turn contribute to a better quality of life and equality for people with disabilities.

The collection is comprised of seven articles, where this introductory article is Article 1. All shed light on various aspects of universal design in the transport sector.

Article 2. **'Functional requirements for inclusive transport'**, discusses the functional requirements that transport solutions must satisfy in order to facilitate social inclusion of people with disabilities (Bjerkan, 2022).

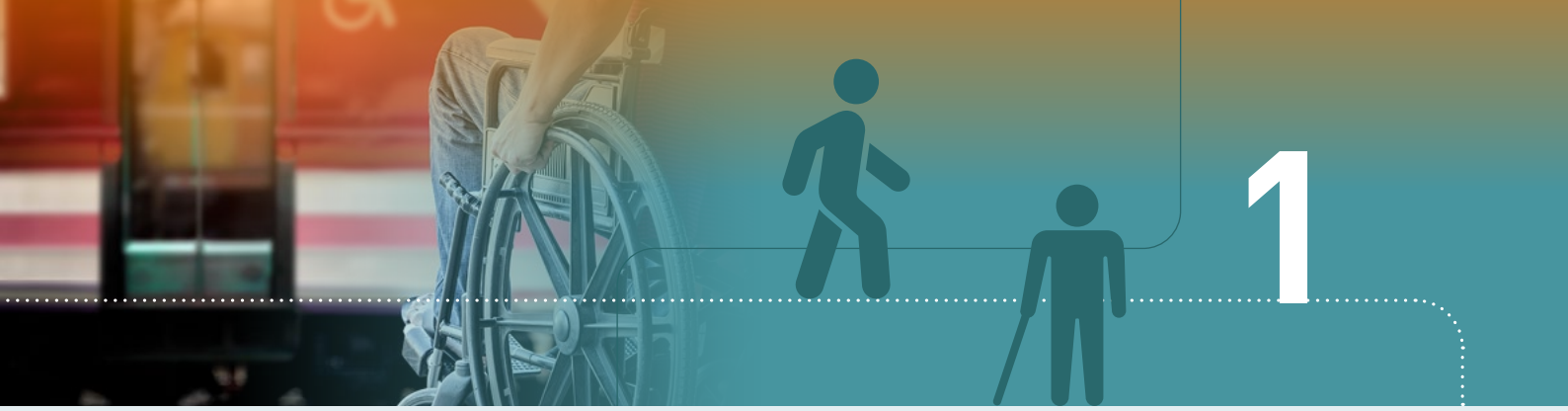
Article 3, **'Universal design and barriers to using public transport**, aims to deepen the understanding of how the transport system is perceived by different groups of people, and to understand and foresee challenges, weigh up the various issues, and facilitate good solutions that benefit as many people as possible (Nielsen and Øksenholt, 2022).

Article 4, **'Universal design and public participation in planning processes**', discusses how universal design can be better safeguarded in the planning process. The article aims to deepen the understanding of the complexity of the planning system, and how this can act as a hindrance for good and holistic solutions (Sjøstrøm et al., 2022).

Article 5, **'How can we ensure universal design of trip chains in a system with complex laws, regulations and responsibilities?'**, gives the reader an introduction to the statutory and organisational framework for universal design in the transport sector, with a particular focus on trip chains. The article discusses how to safeguard universal design of the transport system in a context where legislation and accountability are complex, and reforms alter the distribution of responsibility (Øksenholt and Krogstad, 2022).

Article 6, **'Effects of universal design: quality of life, demand and socioeconomic benefit'**, shows how the utility of universal design for passengers can be measured, and thus also used in cost-benefit analysis, which surprisingly often show that universal design measures in public transport are highly efficient, i.e. they improve social welfare because benefits exceed costs (Fearnley, Veisten and Nielsen, 2022).

Article 7, '**Transport solutions of the future: technology, design and innovation**, describes a selection of new and future transport solutions that are of particular relevance in Norway, and discusses these in the context of what we know about the needs of various user groups. The article demonstrates how new transport solutions are multifaceted and affect the various user groups in different ways (Aarhaug, 2022).



1

Inclusive mobility

KJERSTI VISNES ØKSENHOLT AND NILS FEARNLEY

This article is intended to provide readers with a backdrop for the other articles in this collection. We describe what is meant by an inclusive society and give a historical view of how people with disabilities have been treated and how legislation has evolved. We describe the concept of 'mobility' and how it is used in this collection of articles. We also describe the background to universal design and explain why it poses a particular challenge in public transport.

Kjersti Visnes Øksenholt

Kjersti Visnes Øksenholt is a human geographer and former senior researcher at the Institute of Transport Economics. She has worked for several years on integrated land use and transport planning, regional and urban development and universal design.

Nils Fearnley

Nils Fearnley is a transport economist and senior researcher at the Institute of Transport Economics' Markets and Governance group. Since 2009, he has been working on universal design and public transport through a number of projects for the Norwegian Public Roads Administration, the Norwegian Directorate for Children, Youth and Family Affairs (Bufdir) and its predecessor, Deltasenteret. Fearnley has a particular focus on demand effects, preferences and socioeconomic analysis in relation to universal design.

1. An inclusive society

Society as a concept can be used both on a political and a society is often perceived as synonymous with a national state, while in social science it is more often analysed as a social system (Store norske leksikon). In this collection of articles, society will be discussed both as a social system and in the context of inclusion, belonging etc., and as a political system with laws, regulations and requirements. To *include* means 'comprise or contain as part of a whole'(Oxford dictionary). Even though this is a similar definition to the concept of *integrate*, it differs in meaning in that in integration, it is the individual who must adapt to the community, while the basis of inclusion is an understanding that the community consists of and must be adapted to all its members. An inclusive society can also be linked to both well-being and equality.

Well-being is linked to the individual, and according to Allardt (1975), can be divided into three different fundamental needs: *to have, to love, to be*. *To have* is linked to an individual's material goods and resources. *To love* is linked to an individual's social relationships, such as friendship, love and intimacy. *To be* is linked to an individual's opportunity for self-realisation. These categories are not mutually exclusive, and resources and values can be placed in several of these categories at the same time. Nordbakke and Skollerud (2016) exemplify this by pointing out that employment serves not only as a source of income but also plays a crucial role in self-realisation. For some individuals, paid work can therefore encompass both to have and to be.

'Equality means that all people have the same fundamental human value, while equal rights imply that all people shall be given the same opportunities'

Equality is closely linked to the view of humanity. Lid (2013) defines the view of humanity based on two, non-mutually exclusive understandings: that people are fundamentally alike and that people are fundamentally different. The idea that people are fundamentally different pertains to personal factors such as interests, desires, personality, etc. No two individuals are alike, we are all unique in our presence here on earth. At the same time, we can understand people as fundamentally alike in the sense that all individuals ought to have the same rights and opportunities to live their lives according to their own wishes, regardless of bodily, cultural and social factors. '*The* way we live *with our individual qualities and limitations is fundamentally important and contributes to making each and every one of us the human being we are, different from everyone else and equal to everyone else.' (*Lid, 2013:76; own translation) The notion of equal status comes under the latter understanding. '*Equal status means that all people have the same fundamental human value, while equal rights imply that all people shall be given the same opportunities.'* (Lid, 2013:17; own translation)

The UN Convention on the Rights of Persons with Disabilities (CRPD)) gives clear guidelines about the rights of people with disabilities in terms of, for example, inherent dignity and individual autonomy, non-discrimination, participation and inclusion in society, equal rights and opportunities, and accessibility. Norway ratified this convention in 2013, and is thus also bound to follow the guidance given and work to achieve the objectives of the convention.

The purpose of the convention is to *'promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity'* (article 1).

1.1 From an individual-based to a relational understanding of disabilities

In order to deepen the reader's understanding of universal design, it is useful to provide an introduction to how the view of humanity and the perspective on people with disabilities have changed over time, and how this is expressed through official documents, legislation, etc.

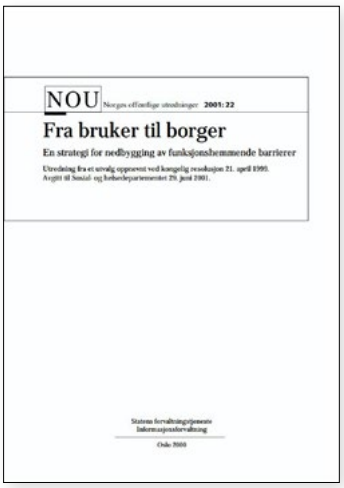
Historically, Norwegian society cannot be said to have been grounded on values such as equal status and equal rights (for a historical overview, see White Paper no. 88 – 1966-67 and the Norwegian Association of the Disabled 2005). Previously, people with disabilities were defined on the basis of, and reduced to, a medical interpretation – that the persons themselves have and experience a disability. It was not uncommon for people with disabilities to be separated from the rest of society. One example of this is found in the 1881 act on 'education for abnormal children', where compulsory schooling was introduced for deaf, blind and retarded children (sic.). *'According to the understanding at the time, children with serious disabilities should preferably be taught in separate institutions, and it was regarded as a duty of the state to establish special schools'* (White Paper no. 88 – 1966-67, p.5). At that time, there was no definition of types of disabilities and

the extent of these, but individuals who experienced the same challenges were grouped together and received special interventions. A common theme was that the 'treatment' they received was often being placed in institutions *'that could look after and care for them and make life as easy as possible'* (ibid, p.5). The introduction of social security in 1916 improved conditions for many people with disabilities, however this public intervention was extremely limited and mainly covered the blind and crippled (sic.) – *'persons with congenital or acquired defects or diseases in the arms, back or legs'* (ibid, p.5). This illustrates the individual-based understanding at the time that targeted measures which strengthened each person's individual capabilities and contributed to a better quality of life and opportunities through rehabilitation and treatment, were preferable (Lid, 2013).

In the 1960s, this individual-based understanding and approach began to receive criticism. It was not necessarily the need for rehabilitation and treatment that was undermined, but rather that people were defined and categorised in relation to each other, based on bodily characteristics. People with disabilities experienced discrimination and felt that they were not regarded as equal members of society (Lid, 2013). 1960 saw the introduction of legislation on disability benefit and rehabilitation. This did not view a person solely in terms of bodily functions, but also as an individual *'as a social being in their social and productive context'* (White Paper no. 88 – 1966-67, p. 7). A focus on disability being a result of external circumstances, and as such created by society through physical, social and cultural barriers, began to emerge. One of the objectives in the aforementioned White Paper was the principle of 'normalisation' in which society should be adapted to people with disabilities in order for them to experience the same standard of living and freedom of choice, rather than expecting the individual to adapt to society.

The relational understanding of the concept of disability, that it is a result of the environment and not of an individual's characteristics, increasingly gained foothold. However, Söder (1999, cited in NOU 2001) claimed that even if this understanding was the basis of a number of research projects and reports, in reality, there is often a tendency to revert to describing and analysing the characteristics of individuals. So people still seemed to be somewhat stuck in the past and the 'old way of thinking'.

The Norwegian Official Report (NOU) 'From user to citizen' (in Norwegian: 'Fra bruker til borger') was published in 2001. This reported on the rights of people with disabilities in a larger context and assessed and proposed a number of strategies and measures to promote participation and equality in Norwegian society (NOU, 2001). The committee also states that it *'in principle gives its support to a relational understanding of the concept of disability'* (NOU, 2001:8; own translation). That same year, the World Health Organisation (WHO) adopted the *International Classification of Functioning, Disability and Health*. This classification system meant that the emphasis was no longer on disease and diagnosis, but on each individual's functional ability in the context of environmental factors (Directorate of Health, 2018).


NOU

Fra bruker til borger

En strategi for nedbygging av funksjonshemmende barrierer

In this period, the Norwegian Association of the Disabled (2005) changed their focus from a fight for rights to a fight for equality.

The UN Convention on the Rights of Persons with Disabilities (CRPD) was passed in 2006, entered into force in 2008 and was ratified by Norway in 2013. The UN Convention defines persons with disabilities to 'include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others' (Article 1)

The legislation on discrimination and accessibility, which entered into force in Norway in 2009, gave people with disabilities protection against discrimination for the first time. The law prohibited discrimination of persons with disabilities in education, employment and other areas of society. The objective of the law was to *'promote equal status and equal rights, safeguard equal opportunities for participation in society for all, irrespective of functional ability, and prevent discrimination on the grounds of disability. The legislation shall contribute to the dismantling of socially constructed barriers and prevent new ones from being created'.*

In 2018, this legislation was replaced by the Equality and Anti-Discrimination Act, the objective of which is to

'promote equality and prevent discrimination on the basis of gender, pregnancy, parental leave, care responsibilities, ethnicity, religion, belief, disability, sexual orientation, gender identity, gender expression, age or other significant characteristics of a person [...]This Act shall help to dismantle disabling barriers created by society and prevent new ones from being created'.

Even though people with disabilities no longer have 'their own' discrimination and accessibility legislation, it can be argued that the changes in the law are a sign of progress because of the increasing emphasis on equal status, equal opportunities and equal rights for all potentially vulnerable persons. People with disabilities are thus included in a broader conceptual understanding and are placed on equal terms with other people who may potentially also experience situational discrimination.

When this collection of articles refers to people with disabilities, this includes persons with reduced mobility, sight and hearing, cognitive and psychosocial disabilities, as well as asthma and allergies, unless otherwise specified. However, this does not exclude persons who do not fit into any of these definitions but who nevertheless encounter disabling barriers.

2. Mobility

Mobility is a concept with many different definitions.

- Mobility can be physical and geographic, and is understood as the ability to move between different destinations as easily and quickly as possible (Freudendal-Pedersen, Hannam, and Kesselring, 2016).
- Mobility can also be social and is understood as a social practice and how this fits together in a system (Sheller and Urry, 2016). It can be understood both in a macro and micro perspective, where the former relates to major social processes such as economic restructuring, social polarisation and development, and the latter is of a personal nature and relates to movement in, for example, employment or the housing market (Easthope, 2009).
- Mobility can be technological and be understood as the opportunity to access or share information across continents and cultures (Sheller and Urry, 2006) and to communicate with others based on new technology that reduces or removes time and space barriers (Green, 2006).

These classifications are not static and exclusive, they are overlapping and based on individual frameworks and interpretations. One example is gender and transport, which can be understood and analysed both in terms of how physical transportation varies according to sex and how the opportunity for movement varies depending on gender, culture and social norms (Uteng and Cresswell, 2008). Sheller and Urry (2016:12) state that *'the scope of mobilities research goes far beyond physical transportation, to map and follow physical and virtual terrains of interconnected systems of uneven mobilities and immobilities of many kinds'.* 1

An example of the broad reach of the concept of mobility can be found by looking at the number of citations of Sheller and Urry's (2006) well-known article 'The new mobilities paradigm'. By 2016, the article had generated over 660 citations in the Web of Science (as per November 2023 it has over 7000 citations according to Google Scholar), and has been referenced in articles about '*ageing, new media, education, security, borders, risk, criminal economy, sport, citizenship, geopolitics, cosmopolitanism, disability, landscape, infrastructures, architecture, surveillance, energy, gender, consumerism, sustainability, globalization, transnationalism, development, complexity, social theory, climate change, social work, planning, management and social science methods, among others*' (Sheller and Urry, 2016:14).

Even though equality, inclusion and social participation are interpreted and defined in different ways, they include being treated in the same way as others, having the same opportunities, having a good life (Rioux and Valentine, 2006) and being an equal participant in society (Lid, 2015). Some feel that participation in different social arenas has increased with the growth of the Internet, social media and other digital platforms (Sépulchre, 2018). Even if digital media are a step on the path to increased inclusion, physical mobility is a prerequisite to achieving rights, equality, inclusion and participation in society. In order to be a fully-fledged member of society, individuals are dependent on physical mobility to varying degrees, both in terms of the job market and their social life.

A number of studies have found that reduced mobility can create social exclusion/outsiderness (Cass et al., 2005, Priya and Uteng ,2009), and people with different types and degrees of permanent or temporary disabilities constitute a group that often experiences this (Barnes and Mercer, 2005, Casas, 2007).

Even if digital media are a step on the path to increased inclusion, physical mobility is a prerequisite to achieving rights, equality, inclusion and participation in society.

Data from the Norwegian National Travel Survey (NTS) show that, in 2013/14, 9% of respondents had physical problems that limited their opportunities for moving around outdoors or using any means of transport. The corresponding figure in 2018/19 was 10% (Hjorthol, Engebretsen and Uteng, 2014, Gregersen and Langset, 2021). The question is phrased in such a way that it catches those with temporary and those with long-term/permanent reduced mobility. The respondents say that the main issue is difficulties with walking and cycling (Table 1). Even though fewer report difficulties with public transport, it is important to remember that a journey by public transport also includes the walk to and from stops and stations at each end. Gregersen and Langset (2021) further find that persons who answered yes to the above question make fewer journeys per day than the rest of the population, even when adjusted for the time of year, access to a car and place of residence.

When reading the table below it is important to remember that the NTS figures are based on an individual-based understanding of disabilities, where the respondents are asked whether they have any physical challenges that make travelling difficult for them. Respondents are not asked whether *the transport system* is adapted to their needs, so this is not based on a relational understanding.

Table 1: Those who have physical difficulties with moving around outdoors or using means of transport experience problems linked to the following transport methods (percentage). Data from the Norwegian National Trael Survey (RVU) 2013/14 and 2018/19

NTS 2013-14 AND 2019, WEIGHTED	PROPORTION OF THOSE WITH DIFFICULTIES, PERCENT	
Do these problems make it difficult for you to ...	2013/14	2018/19
... walk?	77	81
... cycle?	67	71
... fly?	24	18
... travel with other means of public transport?	33	29
...travel in a car as a passenger?	14	6
... drive a car yourself?	29	24

In this article the concept of mobility is based on a physical and geographical understanding unless otherwise specified. We will include and refer to studies that are based on both the individual-based and the relational understanding of the concept of disability, since the results from both types of study may be educational in their own way.

2.1 Mobility as a chosen action

Mobility can be understood as a result of a person's actions. A person's actions are based on their wishes, needs and actual or perceived opportunities (Elster, 1989, Nordbakke, 2014). Mobility thus depends on both the wishes and needs of a person, but also their perception of their opportunities for moving from one place to another.

Jones (1987) divides mobility into three different components. 'Individual actions' are the actual journeys that are undertaken. 'Potential actions' are the journeys that a person would like to be able to undertake, but that for various reasons cannot be undertaken. This could be as a result of limiting factors inherent in the transport system, but it could also be due to constraints linked to the individual, such as lack of time, financial resources, etc. 'The opportunity to action' refers to the journeys that may never be actually undertaken but which the individuals know they have the opportunity to undertake if they so wish.

Other researchers define mobility as opportunities for movement (Knie, 1997, cited in Uteng, 2006) and potential for movement rather than actual movement (Dunn, 1998). Kaufmann (2002) on the other hand, suggests three different factors that affect a person's mobility: whether they have access to transport resources; whether they have the skill to use the transport resources; and whether they actually do use the transport resources. Nordbakke (2014) divides a person's opportunities for mobility into 'individual resources and characteristics' and 'environmental factors'(shown in Figure 1). A person's resources and characteristics are defined as the physical, material, temporal and social resources a person has access to, that can promote mobility and participation in society.

These are factors that apply at an individual level. Environmental factors relate to the surroundings that affect the Individual, and can be defined as the social, temporal and spatial characteristics that promote or prevent a person's mobility. Together they constitute a person's opportunities for mobility, both actual and imagined, and along with needs, wishes and preferences, they will affect every individual's actions and, in turn, their mobility.

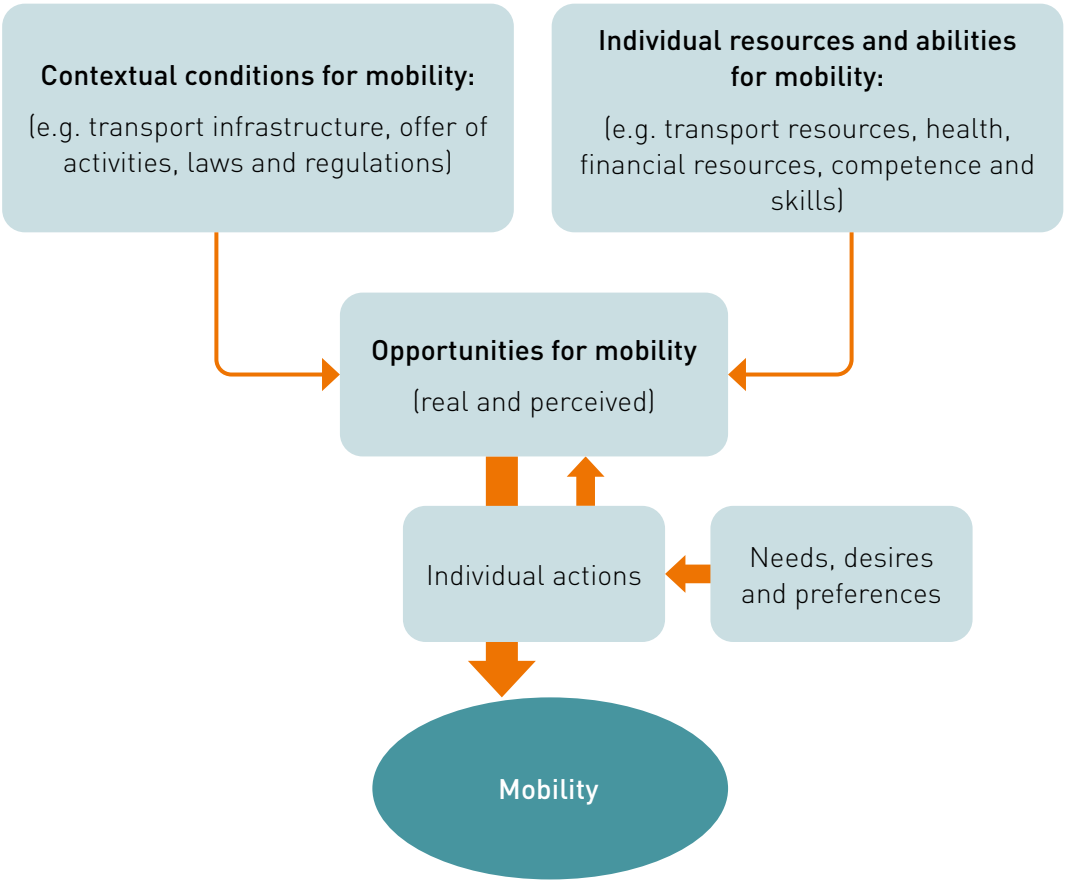


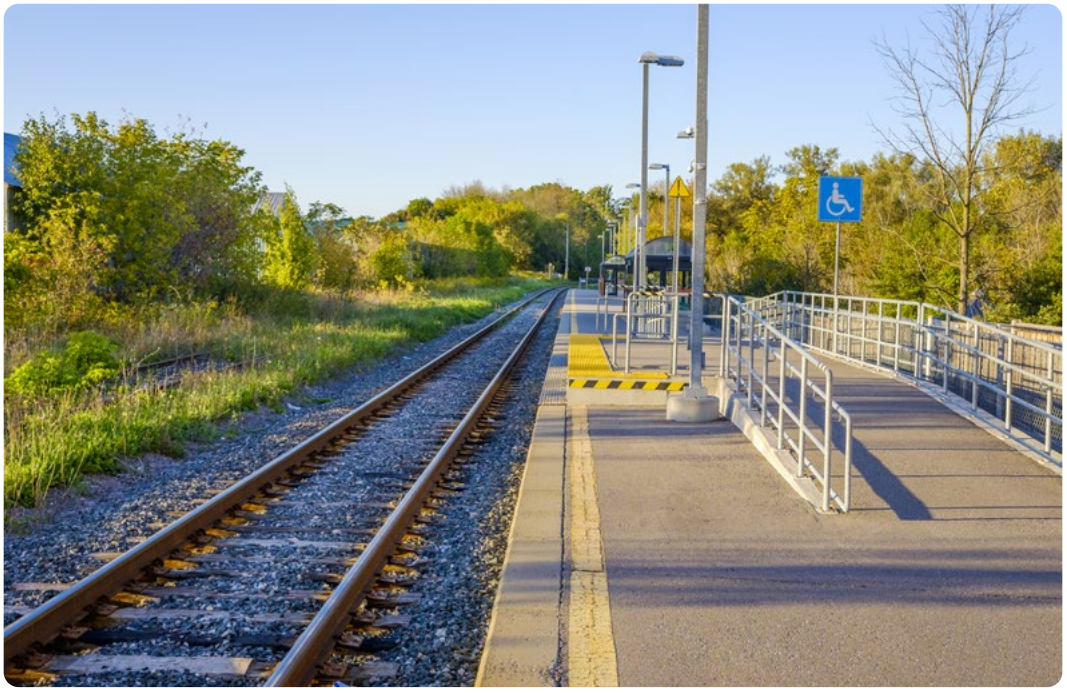
Figure 1: Factors that affect and shape mobility (Nordbakke, 2013, Figure 1).

In addition we can look at a person's travel needs as a result of their travel motivation. Mokhtarian et al. (2015) propose that a distinction be made between different travel behaviours as a result of internal and external factors. Internal factors affect travel behaviour in the sense that the journey in itself is a goal and a perceived benefit, while journeys affected by external factors will only be a means to achieving something else – i.e. the trip purpose. Even though, historically, most attention has been focused on journeys based on external factors, it is noted that not including internal factors will result in underestimating people's actual travel needs and benefits.

3. Universal design

When we use the term disability it is common to distinguish between its use in the context of individuals and when referring to barriers in the environment. On an individual level, the term *disability* is used to describe an individual who has permanent or temporary impaired functionality in physical, mental or cognitive capacities, e.g., loss of or damage to a body part or sensory function.

Disabling barriers, on the other hand, are linked to environmental factors that hinder activity and participation, the premise being that the disability is not a result of an individual's permanent or temporary impairment but rather of the gap between an individual's needs and the inadequate design of the environment. This is in line with the UN Convention (CRPD, Preamble (e)), which states that '*disability is an evolving concept and that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others*'.



Universal design is intended to reduce disabling barriers and to help ensure that the environment no longer impedes participation in society.

Universal design is thus about physical solutions or designs reducing the significance of individual capabilities (Øvstedal, 2009), and about creating solutions that help maximise accessibility, human diversity and equal opportunities for participation in society (Lid, 2013).

The concept of universal design was first raised by the architect Ronald Mace (1985). In Norway, the concept was first used in the 1997 report 'Universal design. Planning and design for all', and was defined as '*the design of products and environments in such a way that they can be used by all people to the greatest extent possible without the*

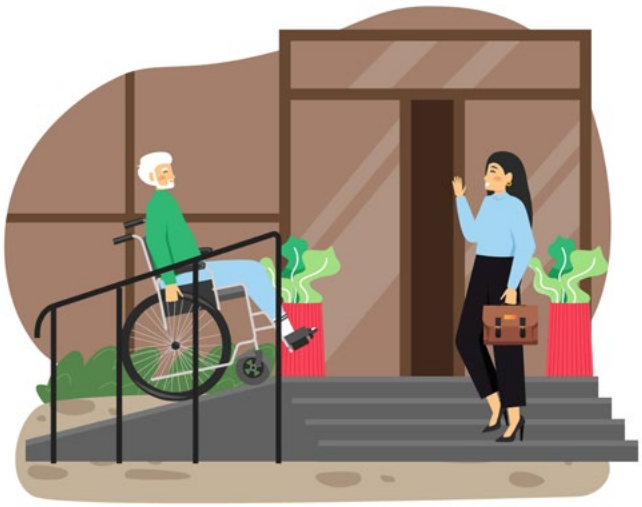
need for adaptation or special design'(Aslaksen et al., 1997:4). Here, universal design is presented as a strategy for designing usable environments for every human being, irrespective of age, size and level of functionality. Aslaksen et al. emphasise that planning should have a sharper focus on solutions that benefit everyone, rather than changing paradigms that focus on children, women, older age groups, etc.

The Syse committee's 2005 definition of universal design is one often used in Norway: '*Universal design means designing or accommodating the main solution with respect to the physical conditions, such that the general functions of the undertaking can be used by as many people as possible'* (NOU, 2005:8). The Syse committee's definition of universal design gives room for a certain flexibility. By stating that universal design is not intended to accommodate absolutely everyone, but as many as possible, the committee delimits the concept whilst simultaneously requiring a more detailed specification of who the target group really consists of and what user prerequisites universal design should address. In this way, special solutions that guarantee accessibility but that are not strictly speaking universal design are also accepted (Fearnley et al., 2015). This definition has been further developed and used in Norwegian legislation:

'Universal design means designing or accommodating the main solution with respect to the physical conditions, including information and communications technology (ICT), such that the general functions of the undertaking can be used by as many people as possible, regardless of disability' (Ministry of Children and Equality, 2017, Section 17)

In the UN Convention on the Rights of Persons with Disabilities (CRPD, article 2) universal design is defined as '*the design of products, environments, programmes and services to be usable by all people to the greatest extent possible, without the need for adaptation or specialised design. "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.*'

In Norway, universal design can be described and interpreted as a vision, a strategy, an instrument and a technical term (Lid, 2013). It can be a vision of a society that includes everyone and where everyone has the opportunity to participate on equal terms. It can be a strategy for counteracting social exclusion and the segregation of groups and solutions. It can be an instrument for achieving the goal of every person being able to function as equal members of society, irrespective of age, level of functionality and type of disability. And it can be a technical term linked to the systematic and practical follow-up and implementation of the requirements for accessibility in legislation, manuals, and standards.



Lid (2013) further distinguishes between universal design on a macro, meso and micro level. On a macro level, universal design can be seen as a strategy that is expressed through statutory objectives and political principles; on a meso level it is

enacted and expressed in standards and technical and physical solutions. On a micro level we find the users' experiences of quality, accessibility and usability.

Wågø et al. (2006) distinguish between universal design, accessibility and access to buildings and public transport vehicles, which can be illustrated by a fictitious building and a fictitious wheelchair user. If the wheelchair user has to use another entrance (basement door, back door, staff entrance, etc.) they will have *access to* the building, but the solution can be regarded as discriminatory. If the building has a wheelchair ramp leading to the main entrance, the building is *accessible* to all. Accessibility thus implies special solutions that make it possible for a person with limited mobility to cross barriers or visit a particular establishment. If the building has been designed in such a way that it allows everyone to use the main entrance on the same terms, it is *universally designed*. This could for example be if the area around the main entrance has been designed in such a way that everyone has step-free access, or a solution consisting of both steps and step-free access (using similar materials) designed in such a way that it appears completely random which option is chosen.

However, universal design does not mean that everyone *must* have the same access to absolutely everything, and aesthetic considerations must still be taken into account. One example of this is highlighted by Lid (2013), who describes the stairs located at Festplassen in Bergen, towards the lake Lille Lungegårdsvann. Some argue that these stairs breach the principles of universal design since they lack safety markings for people with visual impairments and are not accessible for some people with disabilities, e.g. wheelchair users. On the other hand, it can be argued that the stairs bring an aesthetic quality to the square, and are not part of the 'general function'. This case was brought before the Anti-Discrimination Tribunal (case no. 45/2010, pp. 8-9), who concluded that '*Festplassen must be regarded as a whole. As such, it is aimed at the general public and is accessible to all. The complaint concerns a part of the square which constitutes 7% of the whole site and does not form a central part of the area used by the public. The steps leading down to the water are used for sitting on and are, in the tribunal's view, a decorative element that contributes to the aesthetic appeal of the square as it descends towards the water. They are not built as an*

area for vehicles, they do not represent an access path, and they have no central function in relation to arrangements held at Festplassen. […] The tribunal therefore concludes that the stairs neither constitute a main solution in the physical surroundings nor form part of the general function of the space, and that there should be no requirement for the steps to be universally designed'. This illustrates the fact that infrastructure defined as universally designed is not necessarily something that can be used by everybody. We will discuss this further a little later

3.1 Universal design in public transport

Streets, squares and public transport are shared facilities that every member of society should be able to use. The aim is therefore to adapt them for as many people as possible. Universal design in public transport places requirements on vehicles, transport hubs and stops as well as ticketing and information systems. Every one of these must meet requirements (established through standards and guidelines) and adhere to design principles for universal design, and they need to function in conjunction with the other factors. Predictability and step-free boarding as well as enabling the visually impaired to board the right vehicle, place requirements on vehicles, stops and platforms and for vehicles to stop at a given place at a stop or platform. This goes for every single vehicle and every single stop or platform that intersect. Bus drivers approaching a stop should pull in close to the kerb and ensure that any tactile lead lines align with the entrance door beside them. These examples show that the passage between the built environment and the vehicle can be challenging from a universal design perspective. In addition, the access to and from stops and platforms must also follow the principles of universal design.

The 1998 'Action plan for persons with disabilities' describes (to our knowledge) for the first time the principle of sectoral responsibility. This principle entails that each authority is responsible for making the adaptations needed for people with disabilities to use services on equal terms with the rest of the population, and that these same authorities are responsible for supplementing special arrangements if necessary (Ministry of Labour and Social Inclusion, 1998). This is an important principle which still stands. Today, many different actors (local authorities, county authorities, transport companies, the Norwegian Public Roads Administration, the Norwegian Railway Directorate, Bane Nor, the Norwegian Coastal Administration, the Norwegian Maritime Authority, etc.) have their own areas of responsibility within the principle of sectoral responsibility which shall ensure that the functional requirements linked to the footways leading to stops and stations, information, the stops and stations themselves, ticketing, and the vehicles are maintained and work well together. The fact that different actors are responsible for different parts of the trip chain can make it challenging to maintain universal design throughout the whole chain. According to the Delta centre (2003), many people experience breaks in the trip chain. In addition, there is enormous variation in the different scope and types of functional requirements, and they can also be contradictory (Skjerdal, 2005, Øksenholt and Aarhaug, 2018). Having to interact with bus drivers or other personnel can also be a challenge for some people (Aarhaug and Elvebakk, 2012, Øksenholt and Aarhaug, 2015). This happens despite bus drivers saying that they are encouraged by their employers to prioritise service over punctuality (Krogstad et al., 2019). All this makes universal design in public transport a complex issue.

The fact that different actors are responsible for different parts of the trip chain can make it challenging to maintain universal design throughout the whole chain.

Also in public transport, a distinction can be made between universal design and accessibility. The access to and use of a product may be the same for users with differing characteristics irrespective of whether the product is universally designed or accessible. A bus that does not have a low floor entrance, but which does have a lift and thus enables a wheelchair user to board it, is not universally designed, but it has a special solution that makes it accessible (Fearnley et al., 2015). However, several Norwegian towns and cities have developed an 'in-between solution', where low-floor buses with step-free boarding are used at bus stops that are also universally designed, and where a manual ramp can be used at stops that do not adhere to a universal design standard. A wheelchair user will thus be able to use all the three described solutions, but they will be dependent on the driver or fellow passengers to board the bus when using a lift or a manual ramp. A bus with a low floor entrance will make it easier, quicker and more comfortable for other groups to board and alight the vehicle, such as parents with prams, passengers with heavy luggage or older people who have difficulties walking. The faster boarding and alighting will also reduce the time spent at each stop, which is beneficial to the operators as well as the other passengers (Fearnley et al., 2010). Collectively, this is part of the reason why universal design has been found to be socioeconomically viable in many instances (Odeck et al., 2010; see also article 6 in this book). However, many other countries, including the UK, have gone for an 'accessibility for all' approach, which both accepts and partly favours adaptations and special fittings such as ramps and lifts rather than the Norwegian strategy of universal design.

The White Paper 'Better public transport' (Ministry of Transport, 2002:31) emphasises that *'persons with limited mobility who use transport services shall first and foremost be served through adaptation of the ordinary transport system'*, and that special solutions will be additional to that. The principle of sectoral responsibility is also mentioned in the White Paper in connection with the implementation of accessibility measures in public transport, and that the principle of universal design shall be a fundamental element linked to infrastructure and vehicles. During the period 2006-2009, the Ministry of Transport funded an accessibility programme, which was intended to contribute to better accessibility in public transport. Funding for measures was based on a minimum of 25% local co-financing (Aarhaug et al., 2012). This initiative was continued as a government grant scheme for 'better accessibility in public transport', with the same self-financing requirement, through the Ministry of Transport 's budget until 2015.

The grant scheme part-funded municipal and county initiatives to upgrade public transport infrastructure. The objective was to expedite and improve the coordinated effort by all actors to improve accessibility in public transport. The scheme was administered by the Norwegian Public Roads Administration. A before and after survey of selected initiatives that received funding through this scheme shows that the initiatives were well received by people with disabilities, other passengers and drivers. However, the grant scheme did not cover initiatives that covered the whole trip chain, which meant that it was not possible to eliminate all the challenges faced by public transport passengers. These challenges are particularly linked to information about the measures, maintenance, and the drivers' knowledge of the needs of people with disabilities (Aarhaug and Elvebakk, 2012).

During the period 2007-2015 and in parallel with this scheme, rural areas had access to funding from KID (Public Transport in Rural Areas), which funded 50% of public transport measures in rural areas. The county authorities mainly used this funding to prioritise infrastructure in the work on universal design, such as vehicles, transport hubs and stops, as well as ticketing and information systems (Krogstad, 2015).

The majority has already been built

In addition to the inherent challenges of universal design of public transport, it becomes even more challenging when we take into account the vast number of stops and transport hubs around the country. According to Entur, there are more than 58,000 public transport stops in Norway[1], and a large number of stops and platforms are not yet universally designed. In 2015, 103 of the country's 337 railway stations were classed as 'accessible', while 10 were 'universally designed'. In addition,

1 https://om.entur.no/bedrift/om-entur (visited in November 2023).

another four stations were expected to be given universal design status during that same year (Norwegian National Rail Administration, 2016). During the period 2012-2016, 488 bus stops along Norwegian national roads were upgraded to universal design standard, while 28 public transport hubs were upgraded (Norwegian Public Roads Administration, 2017). We have not found any figures for stops along county and municipal roads.

The report 'From user to citizen' (NOU 2001:460) concludes that *'[...] it will be cost-effective to introduce a standards requirement for the needs of persons with disabilities to be taken into consideration ahead of new investments. A requirement for all public transport and all public buildings to be fully accessible within a short period of time will be disproportionally expensive'.*

It further states that even though such a requirement may be well grounded, based on the fairness principle, the costs cannot be justified.

However, a requirement for public transport and buildings to be universally designed can be sensible if this is viewed within a longer perspective and gradually introduced through new investment and major refurbishment. This attitude and understanding of universal design still guides transport policy in Norway (Odeck et al., 2010; Tennøy et al., 2014). Meanwhile, both public and private undertakings aimed at the general public have an obligation to ensure that their general functions adhere to universal design standards, see Section 17 of the Equality and Anti-Discrimination Act.

Previous studies indicate that even if society were to follow the planning and design principles of universal design to the letter, there will always be some who find themselves not included in the initiatives and standardised solutions (Øksenholt and Aarhaug, 2018). The current policy and strategy relating to universal design do not therefore provide for a society which is so accessible that disabilities become irrelevant – something that in principle is also in line with the definition of universal design. *'The idea that universal design guarantees accessibility for all is misleading, because human diversity is so great and the barriers so different that several approaches and solutions are required to create an inclusive society.'* (Lid, 2013:152)

A range of different aids is available for those who are either unable to use regular public transport or have other adaptation requirements, such as an adapted car, adapted transport solutions, etc. However, even with access to such aids, an individual may not necessarily have full mobility in society. Someone who has an adapted car, but who for various reasons cannot use public transport, cannot, for example, choose to have a glass of wine with a meal and then take the bus home. Someone receiving 'support for travel in connection with employment and education' cannot choose to join colleagues for dinner after a day at work without 'losing' a journey. Persons who have been approved for a variant of adapted transport solutions may not receive the level of aid that they actually need, which means they are unable to use any type of adapted transport solutions. The daily transport needs will also not be met for people who are unable to use regular public transport and do not have access to aids. This may have considerable personal and social consequences. It can reduce both their sense of freedom and their actual freedom, making them feel 'trapped' at home. It can also lead to them not feeling like they are part of or actually able to participate in society on the same terms as others. This is problematic both on an individual and a societal level since it contributes to reduced inclusion and participation in society.

4. Universal design is important

Even though universal design cannot reach *everyone* it is still worth striving for. It is important to keep working to maximise the number of people having the best possible mobility and society being as inclusive as possible. Universal design is an important strategy in this work and an important guide for the right kind of thinking.

'Universal design is therefore not first and foremost a finished product, but a process where experience influences the understanding of what should be done and thus what it is possible to achieve [...] The task is to do the best we can, and strive for ever better and more inclusive understandings' (Lid, 2013:86; our translation). Universal design as a vision strengthens the focus on holistic solutions that encompass as many people as possible rather than measures that only cater to the needs of certain groups. A society that continually strives to maximise inclusion through universal design and accommodates those who for various reasons are unable to use these solutions will promote increased participation in the labour market and in society in general. This is a society that takes care of its citizens on an individual level and helps each and every one of them to make the most of their potential so that they can contribute to increased welfare and value creation in society. Only then can society exploit the potential inherent in every citizen whilst also safeguarding inclusion and equality (Øksenholt and Aarhaug, 2018).

5. Further reading

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