
The role of the university in making the built environment more accessible and inclusive for people with disability: A case study from New Zealand

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Abstract

The need to reduce inequality for people with disabilities is a strong theme in the United Nations Sustainable Development Goals. Cities and communities should be inclusive, but the Built Environment has many buildings and spaces with problematic access features that make full participation impossible for this demographic. Universities can play an important role in addressing the issues underlying barriers to access and in providing clear steps for improvement and inclusion. The role involves interacting with all the key stakeholders including people with disabilities, disability advocacy organisations, construction professionals, legislators, students and the general public. This research demonstrates the role in a case study project by two New Zealand universities. A panel of experts with a lived experience of different disabilities provided oversight. The academics designed coursework to facilitate student engagement in the concepts of Universal Design and supervised student research involving building owners, advocacy organisations, construction professionals and people working in buildings. Presenting the research to audiences of legislators, construction professionals, advocacy groups and others interested in accessibility helped raise awareness amongst the stakeholders and led to a petition to the government with recommendations for achieving improved accessibility in the Built Environment. Other outputs included fact sheets for construction businesses, conference presentations, reports and articles for academic journals. The research plan may provide a useful roadmap for other academics to follow in their attempts to improve accessibility and inclusion in the Built Environment for people with disabilities.

Keywords

Accessibility, disability, Built Environment.

1 Introduction

The number of people with disabilities (PWD) is substantial. It is estimated at 16% of the world's population (WHO 2023) and 26% of the U. S. population (CDC 2020). In New Zealand 24% of the population are PWD, with 59% of all PWD aged 65 years or older (MacPherson, 2014). Reducing inequality and promoting inclusivity for this demographic is prominent in the United Nations Sustainable Development Goals (SDGs). The goals describe empowering “social, economic and political inclusion for everyone including PWD” (SDG 10), promoting inclusive accessibility in urban planning, public spaces and transportation (SDG 11), providing inclusive education (SDG 4) and “full and productive employment” for PWD (SDG 8) (United Nations 2015). However, the goals are unachievable if the buildings and spaces associated with these activities, such as parks, entertainment venues, government buildings, transportation, schools, workplaces and their connecting routes, are inaccessible to PWD. Unfortunately, the Built Environment remains challenging for PWD and efforts to address this through the principle of Universal Design (UD) are slow (Zallio and Clarkson, 2021; Watchorn *et al.* 2021).

Providing good access for PWD is complex for two reasons. Firstly, the type of disability may involve physical, sensory and/or intellectual impairment and each places different, and sometimes conflicting, requirements on building design (Carlsson *et al.* 2022). Secondly, there are many stakeholders involved in the process of collating the varying needs of PWD, turning those needs into well-defined design specifications and implementing, monitoring and enforcing the changes to the Built Environment. This aim of this research is to use a case study to illustrate a possible role of the academy in providing a pathway for improving Built Environment accessibility for PWD in the New Zealand context. The research objectives are:

- To identify the stakeholders and define their contributions to controlling accessibility.
- To collect data on accessibility issues from the stakeholders.
- To demonstrate how the barriers to accessibility for PWD can be addressed in the academic environment in ways that maximise the impact/usefulness of the research.

The research is a collaborative effort by two New Zealand universities. It considers only accessibility in public buildings and spaces in New Zealand, excluding private dwellings and infrastructure. Other limitations include the participation of stakeholders living in New Zealand and only PWD who are adults, i.e., excluding children with disabilities and caregivers.

2 Literature Review

The efforts of researchers in the area of inclusive access to the Built Environment have mostly investigated a single aspect of the problem, such as defining the challenges faced by PWD, measuring building access features using auditing tools, investigating flaws in accessibility legislation, looking at the business case for improving accessibility and gathering the perceptions of people involved in buildings (both construction professionals and building occupants). Section 2.1 provides an overview of these aspects. Relatively few researchers have examined the problem from a holistic perspective, considering two or more groups of stakeholders and their findings are presented in section 2.2.

Factors affecting inclusive access to the Built Environment for PWD

2.1.1 Access barriers for PWD

Most research has focussed on physical features that present access challenges for people with physical impairments, particularly related to mobility (Torkia *et al.* 2015). Some studies have looked at access barriers for those with sensory impairment such as vision and hearing (Ayoung *et al.* 2021; Jeamwatthanachai *et al.* 2019; Keerthirathna *et al.* 2010), but relatively few have considered the challenges of people with cognitive and neurodiverse impairments (Ijadunola *et al.* 2019; Kinnaer *et al.* 2016; Malcolm 2022). Many PWD have more than one impairment and/or impairments that vary in severity over time and the elderly make up the largest proportion of PWD (Perry *et al.* 2021). Aside from physical barriers, PWD are commonly exposed to negative treatment by other building occupants, and this can only be improved by raising public awareness of the experience of PWD (Heylighen *et al.* 2016; Fisher and Purcal 2017).

2.1.2 Measuring building access features

A variety of audit tools are used to measure physical features that provide access in the BE. They consist of checklists, usually adapted from the regional legislation, and customized for particular types of building, such as AIMFREE for gym assessment (Rimmer *et al.* 2017). They provide an efficient and consistent metric but are often regarded as a “tick-box” exercise that fails to capture the essence of UD, namely the “usability” of the space by PWD (Watchorn *et al.* 2023).

2.1.3 Accessibility legislation

Many countries that ratified the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD 2006) have developed disability strategies and disability anti-discrimination legislation, coupled with building codes and standards in order to implement inclusive access for PWD (Whaley *et al.* 2024). These are comprehensive and strictly enforced in some countries such as the U. S., where lawsuits drive improvements in access (Eisenberg *et al.* 2024; Arditi 2017). However, in New Zealand they are ambiguous, and enforcement is minimal (Stewart, 2021; Calder *et al.* 2018). Forster *et al.* (2021) note the importance of clear, comprehensive policies, strict monitoring and significant penalties for non-compliance. Finally, communities drive political change and improved accessibility legislation (Larkin *et al.* 2015) but a key concern of policymakers is the fair use of funding resources for the benefit of the entire community (Saha *et al.* 2021).

2.1.4 The business case for improved accessibility

There is a tendency for construction professionals to design buildings with the minimum level of accessibility that just meets the required legislative compliance in order to minimise the project cost (Zallio and Clarkson 2021). Going beyond minimum access features can provide economic benefits to construction stakeholders, particularly in the tourism and transportation businesses (Terashima and Clark 2021). The PWD population is immense and is predominantly elderly, with large discretionary income. Therefore, this demographic represents an enormous potential market for those businesses who cater to their accessibility needs (Yin *et al.* 2018).

2.1.5 The perspectives of building professionals and building workers

PWD have a poor opinion of building professionals (designers, managers and owners), viewing them as the proximal cause of poor accessibility in the BE and failing to acknowledge their need to be competitive (Watchorn *et al.* 2021). Building professionals, in turn, are reluctant to assume the responsibility and cost of providing better access and are generally apathetic about the problem (Kadir

et al. 2018; Watchorn *et al.* 2024). The same is true of people working in buildings, such as restaurants and shops; they perceive the provision of better access features and training programs as factors that reduce the profitability of their businesses (Flemmer and McIntosh, 2024).

Holistic perspectives on inclusive accessibility in the Built Environment

Recent research into providing more inclusive access to the Built Environment for PWD recognises the complexity of the problem and includes:

- The need to consider the different activities and occupations of PWD in buildings and aim at true usability rather than legislative compliance (Watchorn *et al.* 2021).
- The importance of co-design with PWD “user-experts” consulted at all stages in producing new buildings (Watchorn *et al.* 2024).
- Multiple stakeholders including occupational therapists, architects, PWD and their support organisations, government regulators and communities need to be involved in order to implement UD successfully (Eisenberg *et al.* 2024; Saha *et al.* 2020; Larkin *et al.* 2015).
- The need to include information on UD in construction-related degrees (Watchorn *et al.* 2024; Larkin *et al.* 2015).
- Using a variety of knowledge motivation strategies, such as videos, photographs and games to inform decision makers, urban planners and the community about non-inclusive accessibility, while recognizing that this does not necessarily result in active change (Labbé *et al.* 2020).

In summary, a review of the literature highlights the complexity of providing inclusive access to the Built Environment and points out some of the factors that hinder progress. The numerous stakeholders should all be consulted, but their different priorities, poor inter-communication, lack of knowledge and ambiguous responsibilities make the consultation process difficult. Community involvement is essential for voter interest, which in turn drives policymakers to change legislation. Finally, education of the future building practitioners is a key element in achieving better accessibility for PWD.

3 Research Methodology

The research began in 2023 and will end in February 2025, so this article reports the preliminary activities and results. The first stage, addressing Objective One, involved identifying New Zealand stakeholders (SH). Chief amongst these are PWD (SH1), organisations supporting PWD (SH2) and organisations advocating on behalf of PWD (SH3). Other stakeholders are the New Zealand legislators (SH4), people in the construction sector (SH5), people working in public buildings (SH6) and postgraduate students from Massey University’s School of Built Environment (SBE) and from Auckland University of Technology (AUT) (SH7). The academics selected from SH1 to SH3, seven people with a lived experience of disability to form an Accessibility Advisory Panel (AAP) who provided oversight on all stages of the research. During the selection, they established a wide network and offered presentations on the research project to increase awareness amongst the SH1 to SH3 members. Figure 1 shows the interactions between stakeholders. The roles of the academics were to:

1. Use their established network to collect survey data from the PWD on the challenges they experience when trying to access public buildings in New Zealand. The AAP members co-designed and reviewed the survey questions and helped format one version of the survey for people with vision impairment. Other versions of the survey included a Qualtrics online format

(distributed on organisation websites, newsletters, and social media) and a standard Word document for people preferring to respond offline. PWD could also dictate their survey responses by phone or in a Zoom meeting. The survey was activated on 30th September 2024 and run for two months. To increase the response rate, participants could opt to enter a lottery to win one of twenty \$100 (NZD) gift vouchers.

2. Supervise students through course work and research to raise their awareness of the issues involved in providing better access to public buildings for PWD.
3. Disseminate useful information related to improving access to public buildings for PWD to legislators, people working in the construction sector, people working in public buildings and the academic community. The AAP reviewed and co-designed the research outputs.

The research involving a survey of PWD was reviewed by the Massey University Human Ethics Committee Ohu Matatika 1 and received ethics approval ID OM1 24/20 on 17/7/2024. During this review, the committee imposed two limitations on the survey respondents (PWD), namely that they had to be adult (18 years or older) and that they had to be able to provide their own opinion. The latter meant that the researchers had to exclude the opinions of caregivers and children with disabilities.

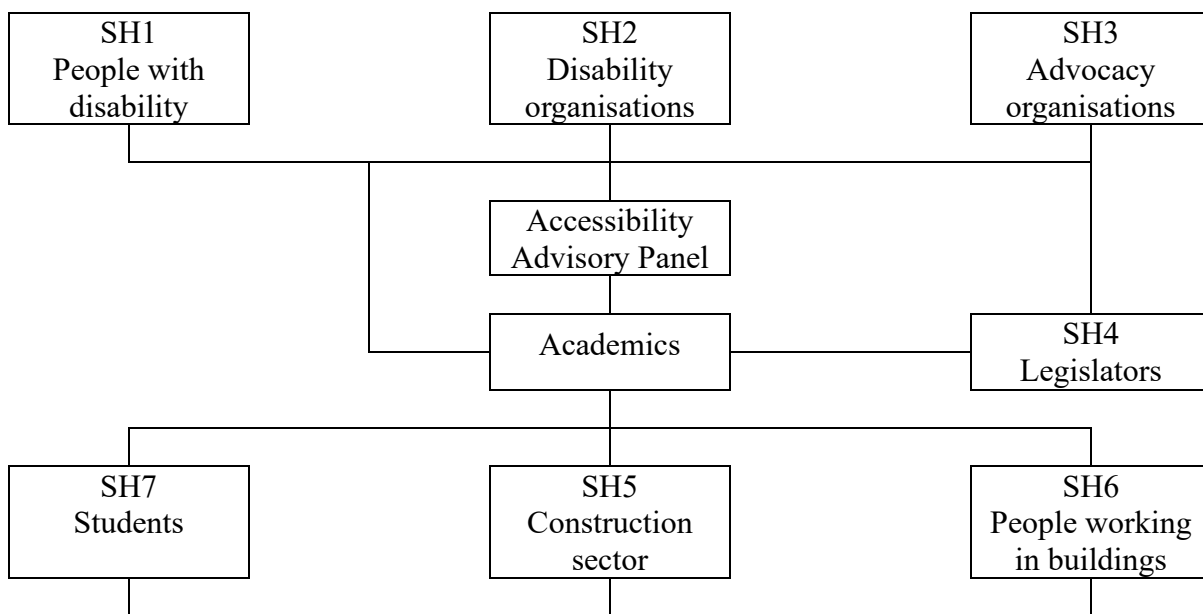


Figure 1. Relationship between the academics, Accessability Advisory Panel and the stakeholders (SH) in the research

The AAP members had a range of impairments related to mobility, vision and hearing and were active participants in organisations representing those impairments (such as New Zealand Spinal Trust, Muscular Dystrophy and Deaf Aotearoa), as well as in organisations representing or advocating on behalf of all types of disability (CCS Disability Action, Making Trax Foundation, Be.Lab, and People First Taranaki). During panel member selection, many other organisations in the groups SH2 and SH3 were identified and agreed to provide access to the people in group SH1 through their organisations.

4 Findings and Discussion

The research ends in February 2025, so only preliminary results are reported here. Objective One, the identification of key stakeholders and their involvement in access to the Built Environment for PWD was discussed in the preceding section. The progress on collection of data on accessibility issues (Objective Two) and on maximizing the research impact (Objective Three) are discussed below.

4.1 Collection of Data on Accessibility Issues from the Stakeholders (Objective Two)

The AAP members provided their perspective on barriers to accessing public buildings and co-developed the survey questions for New Zealand's PWD (SH1). The survey was activated for a two-month period, beginning on 30th September 2024. Approximately 24% of New Zealand's population of 5.4 million people (Statistics New Zealand 2014, 2024) identify as having a disability. Power analysis (Calculator.net nd) indicates that a sample size of 281 survey respondents will provide statistical findings with a confidence level of 95% and a margin of error of $\pm 5\%$. The number of responses currently exceeds this sample size, and statistical analysis will be done when the survey closes.

Preliminary data from groups SH5, SH6 and SH7 includes survey data on the perspectives of 61 building professionals (quantity surveyors, construction site managers, project managers and architects), accessibility audits of case study buildings (10 shops, 10 libraries and 11 restaurants) and interviews with people working in the case study buildings. Table 1 summarises the main findings and detailed results are reported in Flemmer and McIntosh (2024).

The work has been extended to collect more survey data on building professionals, accessibility audits of churches, government buildings, gyms, university buildings, bus stations and train stations and interviews with the people working in those buildings. Data collection ends in February 2025.

Table 1. Summary of preliminary research findings

Parameter: Perspectives of 61 New Zealand Building Professionals			
<ul style="list-style-type: none"> • No consensus on whether existing mandatory legislation is adequate or should be strengthened. • Little knowledge of or interest in whether existing buildings meet the needs of PWD. • Strong resistance to bearing the responsibility and cost of improved access features. 			
Parameter: Perspectives of people working in case study buildings			
<ul style="list-style-type: none"> • Awareness of legislation and training relating to accessibility is better for people working in large shops and in government-funded buildings such as libraries compared with people in small shops and restaurants. • Cost, lack of space, and lack of knowledge on implementation are the main barriers to improving accessible features in smaller case study buildings. • Accessible features are mostly provided for people with mobility impairment. Little is done to cater to the access needs of people with other types of disability. 			
Parameter: Range of compliance of case study buildings with NZS4121:2001 standard for accessible design			
Building Type	Compliance		Least accessible features
	Range (%)	Average (%)	
Shops	13 - 67	38	Access ramps, shelves, checkout counters
Libraries	40 - 100	92	Accessible parking, access ramps, aisle clearance
Restaurants	73 - 100%	89	Access ramps, accessible dining tables

4.2 Academic Roles Aimed at Maximising the Impact of the Research

4.2.1 Education of Students

The primary role of academics is education of students. Each year, approximately 200 students enroll in Masters degrees at Massey University’s SBE, specializing in Construction Law, Quantity Surveying, Construction Management or doing a Master of Construction degree without specialization. They are the future professionals in the construction sector, with roles such as legal advisors, quantity surveyors, project managers and facilities managers. To raise their awareness of the problem of accessibility of the Built Environment for PWD, all 200 students were required to do a review of the recent literature on this topic as part of a compulsory course in Research Methods. Students chose the topic that matched their specialization or their interest from the options listed in Table 2.

The assessment also required an explanation of the meaning of Universal Design and of the rights defined in the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD 2006) relating to access to the Built Environment for PWD.

Table 2. Topics for an assessment in the Research Methods course (compulsory for all MConstr. Students)

Topic	Description
A	The cost and/or measurement challenges associated with implementing Universal Design in public buildings and spaces.
B	The construction management challenges in providing access in public buildings and spaces for users with a range of different disabilities
C	The way in which legislation (such as NZS 4121:2001 Design for access and mobility – Buildings and Associated Facilities) and practice (such as New Zealand’s Disability Strategy policy) aim to control the accessibility of the built environment for people with disability.
D	The key accessibility challenges faced by users with a range of different disabilities (such as mobility, vision and hearing impairment) in accessing public buildings and spaces.
E	Studies that focus on measuring the accessibility of specific aspects of the public built environment, such as libraries, parks, etc.

Having completed that course, 25 to 30 of the masters students used the topic for their research course, doing projects such as auditing case study buildings, reviewing legislation on inclusive accessibility, reviewing global best practice, reviewing auditing tools, assessing the cost benefit analysis of making buildings more accessible, and investigating the opinions/knowledge of building professionals and people working in the Built Environment. The academic staff are also involved in supervising doctoral student research in improving accessibility for PWD and in the benefits of accessible and inclusive tourism to New Zealand.

4.2.2 Research Outputs for Stakeholders

Alongside the standard academic outputs such as journal articles and conference presentations, the academics established symbiotic relationships with the stakeholders, for example:

1. During the recruitment of members for the AAP, an academic researcher was asked to participate in a webinar by Access Matters Aotearoa (AMA) Trust, an advocacy group promoting improved accessibility for PWD in New Zealand supported by 56 disability-related organizations. The researcher presented collated data in the area and made recommendations for improving accessibility. They then helped AMA draft a petition to the government with nine actions that should be implemented to improve access for PWD. The petition was announced on the SBE LinkedIn site (6,000 followers) and currently has 672 signatures. The researcher and AMA will present it to the government. In return, AMA publicized the researchers’ survey for PWD on the AMA Facebook page (441 members) and on LinkedIn (708 followers).
2. Building professionals and people working in buildings provided data in the SBE masters student research projects. In return, the academics used their research findings and advice from the AAP members, to write simple fact sheets and articles for the businesses and people assisting in the master’s research. This helped increase the knowledge of the problem amongst SH5 and SH6.

The preliminary research findings exposed two important aspects; firstly, the responsibility for the cost of providing more inclusive access to the Built Environment, and secondly, the way to maintain and enforce the accessible features in public buildings. PWD feel that the stakeholders involved in providing buildings (i.e., the builders, architects, building owners and building managers) should bear the cost of providing accessible features. The construction sector stakeholders feel that this is an unfair burden on their businesses and cite cost as the main reason for not providing better accessibility. Since inclusive access is a societal problem, Flemmer and McIntosh (2024) opine that the cost should be born by all New

Zealand taxpayers. Government subsidies for accessible features would be a strong motivator for construction sector stakeholders to provide more accessible buildings. Adding the accessible features to the building's Warrant of Fitness, alongside other critical features, provides a way to maintain and enforce the inclusive access in buildings (Flemmer and McIntosh 2024). These solutions were two of the nine recommendations in the petition.

5 Conclusions and Further Research

For several years researchers in the academic environment have worked on the problem of Universal Design and inclusive access to the Built Environment. However, a lack of involvement of all the key stakeholders has meant that many of their findings have been limited and most have not led to real improvement. This is hardly surprising because political activism is not the main function of the academy. If academics have a role, it must surely be the collation of data from all stakeholders in the research area and the drawing of conclusions as to what might be fruitful initiatives. We present a case study showing how this role has been handled by two universities in New Zealand. Firstly, symbiotic relationships between advocacy groups, disability organisations and academics led to the development of a petition with nine actions that the New Zealand government should take to improve access to the Built Environment for people with disability. The relationship amplified the exposure of the petition and increased the uptake of an academic survey collecting information from PWD on their experiences when trying to access public buildings. Future work will comprise the analysis of this data to get a more accurate picture of the research field and lobbying the government to act on the recommended steps.

Secondly, a mutually beneficial relationship between academics supervising student research and construction sector stakeholders facilitated access to data on case study buildings and on the perspectives of construction professionals and people working in public buildings. In return, fact sheets and short articles were used to increase the knowledge of these stakeholders on different aspects of accessibility in the Built Environment. Preliminary results show that many public buildings in New Zealand fail to provide good access to people with disabilities and that many construction sector stakeholders know very little about the need for Universal Design.

Finally, approximately 200 students per year will get Master of Construction degrees from Massey University's School of Built Environment and begin careers in the construction sector. The inclusion of information on different aspects of Universal Design in the mandatory courses of the master's program, means that future construction lawyers, quantity surveyors and construction managers will know more about this important topic. The case study has illustrated a collaborative effort between all the stakeholders that can be followed by other academic institutions, ultimately helping to improve the accessibility of the Built Environment for people with different disabilities.

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