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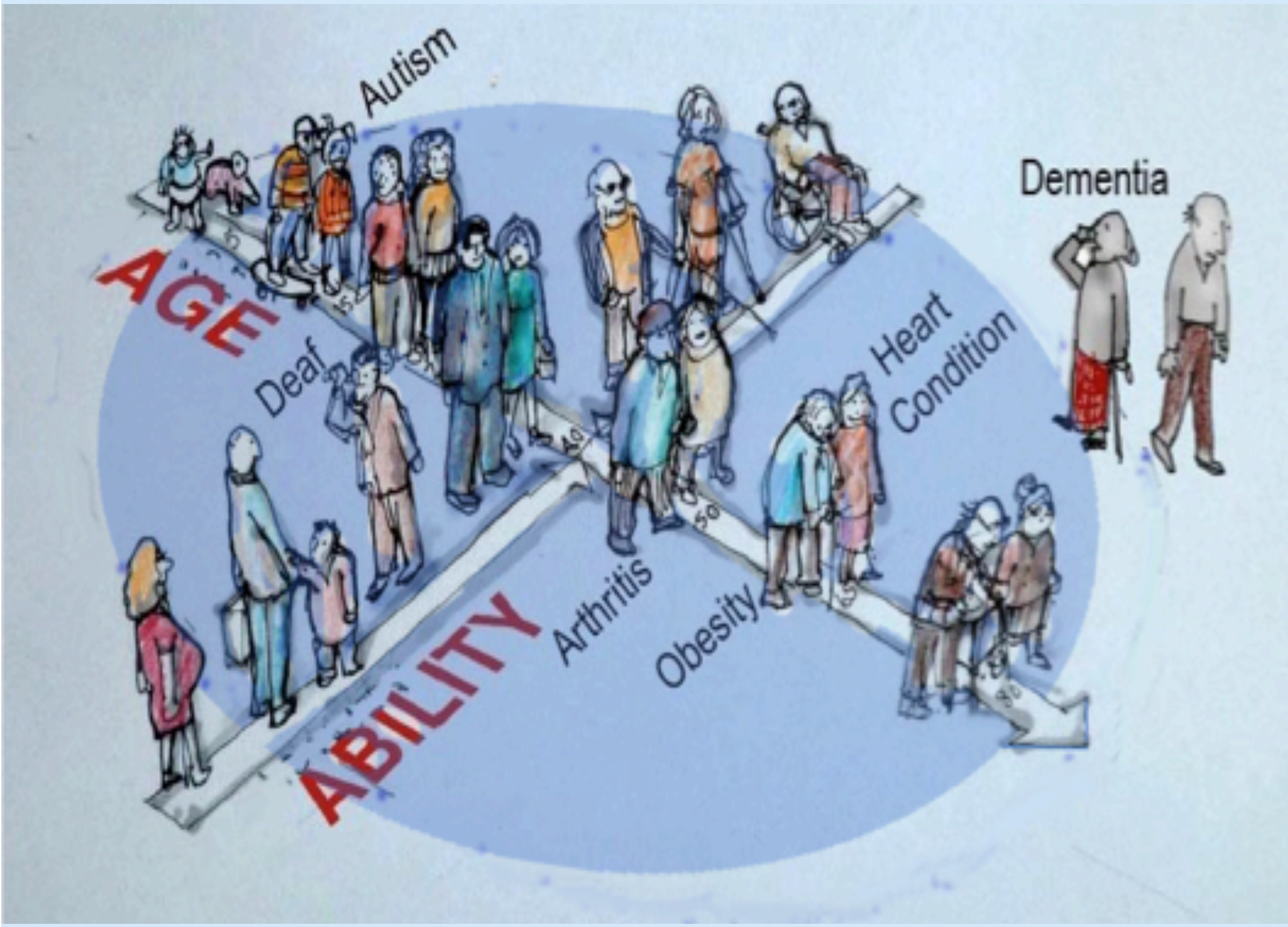

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GUEST EDITOR

Dr Cathy Dalton is an architect and researcher with a career-long involvement in Universal and Inclusive Design, advocating for inclusion through her design and research. Her current work is in the area of Design for Neurodiversity/Sensory Design, as a critical aspect of Universal Design, and in particular its intersection with existing practice and standards. She co-founded Dalton & O'Donnell Architects, whose clients included the National Disability Authority and Health Services Executive (Ireland), and served as Treasurer to the Institute of Design and Disability (Ireland) the forerunner of EIDD/Design for All Europe. After Dalton & O'Donnell, she was awarded the first PhD in Architecture by UCC in 2014, and held an EU MSCA post-doctoral research fellowship in AssistiveTechnologies from 2015-18, investigating "tunable" sensory environments and cognitively restorative environments for people with Autism Spectrum Conditions and ADHD. She has contributed to inclusive housing policy in Ireland, most recently in relation to housing adaptation grants, and also in promoting systematic adaptation and re-use of older housing stock as an initiative to address the housing

crisis. She has published numerous papers and articles on her work, and reviews and edits academic papers for conferences and journals. Dr Dalton is a part-time lecturer at CCAE (Ireland), where she has most recently lectured on Design for Neurodiversity. She has lectured at Ulster University in Creative Technologies and Design, and guest-lectured and contributed to PhD mentoring and teaching at Slovakian Technical University Faculty of Architecture Design, University of Wales Trinity St David and UCL.

GUEST EDITORIAL:

Designing for the Invisible

It's both a pleasure and a privilege to have been invited to guest-edit Design for All India for a second time. My first outing was in 2013, coming towards the end of my PhD thesis. Most of the credit for that issue should go to my supervisor, Dr James Harrison. This issue includes two papers he has authored, perhaps as a repayment, or alternatively making me even further indebted to him.

We live in a rapidly-changing world, a world where designers are called on to address an increasing number of new challenges. The news is dominated by international conflict and the refugee crisis, against a backdrop of climate change. Voices are finally being raised about the hitherto uncritical global adoption of AI, reflecting widespread public concerns about loss of digital privacy, and its further implications, with a huge and growing energy cost. The arrival of long-predicted demographic changes means that we also live in a world of of ageing and older people, a matter of a couple of short decades away even in India. This has obvious impacts on who we must design for, the person who is our "Universal User". It includes our future selves, in the words of Roger Coleman, as well as people who are still largely "invisible" to designers. In Universal Design circles, a growing amount of current discourse centres around the idea of designing for "neuroinclusion", which stands not only to serve people who were born neurodivergent, but also the rapidly-growing cohort of older people, among whom women will

predominate globally. In this issue of Design for All India, we touch on some of these issues, with contributions on Design For Neuroinclusion and redefining Universal Design, concluding with a timely and incisive analysis of the tensions between AI and disability.

Universal Design remains the uniting factor: *design for us all, by us all*.

Dr Cathy Dalton B Arch, FRIAI (non-practising)
September 2026

Jim Harrison retired recently from 18 years teaching and researching at the Cork Centre for Architectural Education, Ireland. Previously he practiced architecture and taught in England, Zambia and Malawi and went on to become Associate Professor in Architecture at the National University of Singapore, moving in 2004 to Queen's University Belfast. In that year he was awarded a LittD (Doctor of Letters) from his alma mater, the University of Sheffield, for his extensive publications promoting Universal Design and design for ageing, including work as a United Nations Expert in the Asia-Pacific region and consultancy to the Singapore government on access legislation.

As an active octogenarian he now feels qualified to write and advise from first hand experience on matters related to inclusive and age-friendly design in the built environment.

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Re-examining the Seven Principles of Universal Design

Jim Harrison, LittD. BArch

Cork Centre for Architectural Education, Ireland *(retired)*

Most people want to live a long life, but few want to grow old. Ageing implies an almost inevitable reduction in our functions, both physical and mental which will, in turn, require adjustment in our lifestyle in many different ways if we are to continue to enjoy the quality of life that we deserve. The built environment, whether in our own home-zone or in public facilities, plays a significant part in determining our safety and comfort, whatever our age or ability; but in later life the effects of poor design can have an increasing impact, leading to the inhibiting of personal independence, exclusion and withdrawal from social connection, but even more significantly, the risk of serious personal accidents.

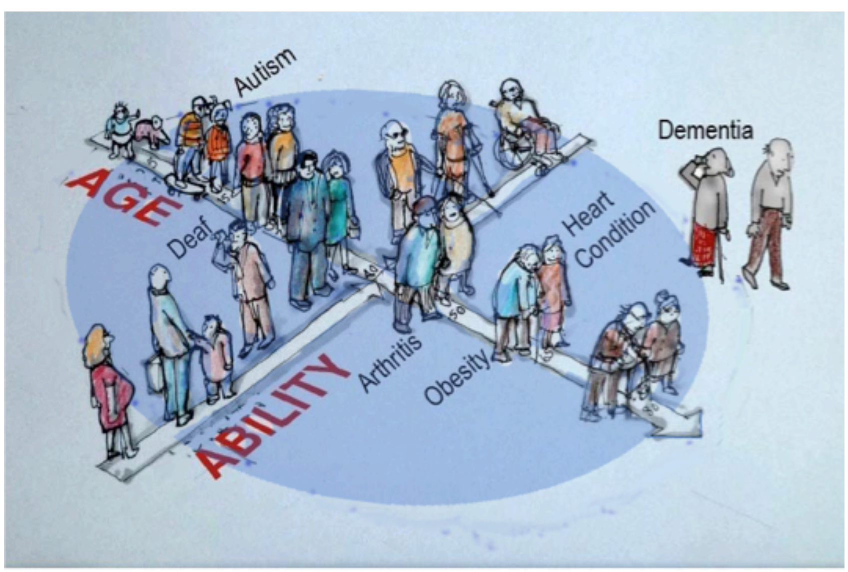

Fig 1. Universal Design benefits not just people with disabilities. The ageing process can bring an accumulation of minor disabilities, requiring adjustments to compensate for physical and mental limitations.

The ageing process brings physical changes with increasing limitations of a person's ability in diverse ways. Collectively, any individual's physical or sensory limitations, whilst not easily described as 'disability', can restrict or potentially endanger their everyday activities. Though injury or medical conditions like arthritis or Irritable Bowel Syndrome may not define a person as having a disability, these may significantly reduce the person's ability to live as they did before. Decline in cognitive, physical, motor and sensory systems are a natural part of ageing but adapting to these changes may be a challenge, depending on how rapidly they occur. Decreased vision, slower reaction times, lack of balance or reduction of feeling in the limbs may increase vulnerability and the risk of falling and with it the fear of an accident and potential hospitalisation. In older age an accidental fall can be far more catastrophic than for a younger person. Osteoporosis, obesity and other weakening conditions can increase the severity of the fall and the risks associated with cross-infection during hospitalisation are significantly higher for older people.

In the light of Universal Design's increased age-related applicability and the continuing raising of standards and expectations, it may be timely to re-examine the well-established Seven Principles (1) as below:

1. Equitable Use

2. Flexibility in Use

3. Simple and Intuitive Use

4. Perceptible Information

5. Tolerance for Error

6. Low Physical Effort

7. Size and Space for Approach and Use

For design of the built environment the last three are the most applicable.

Principle 7, 'Size and Space for Approach and Use', is probably the closest one that relates to physical accessibility and suggests definable dimensional terms.

Principle 6, 'Low physical effort', is widely applicable, implying that consideration should be given to the user's stamina. In older age, especially where the individual has cardiac or arthritic problems, designers can anticipate potential problems and take simple planning measures, such as reduced distances to amenities, provision of seats and landings on staircases, or by specifying energy-efficient elements, such as door closer devices that that only require a light pull or push.

Whilst one of the most valuable outcomes of UD is that of providing accessibility and inclusion, in practice the need for safety may override this. Principle 5 of the Seven UD Principles states "The design minimises hazards and the adverse consequences of accidental or unintended actions." advising us to "arrange elements to minimise hazards and errors" and "provide fail safe features."

Accessibility and safety are not always synonymous - so where does safety come in? This must surely be given a much higher value than access, particularly for a more vulnerable cohort of users; it is one thing to be unable to enter a building because there are steps or narrow corridors, but quite another if there is a risk of danger, real or imagined, in any daily activity. Although building codes other than those related to accessibility may take many of these aspects into account, their scope is possibly too narrow to protect the user who may be susceptible to falls or being knocked down in traffic. So, if Principle 5. 'Tolerance for Error' is the only one that goes some way towards addressing this gap, does this go far enough? Although an environment may accord with safety standards it may still be inhibiting for the vulnerable user. How do I know that a ramp surface is not slippery or that a horizontal handrail will not be a hazard for an adventurous child?

Fig 2. The same element of a design can present a real hazard if not applied intelligently.

As an example of the need for awareness of potential dangers we might imagine the design of a balustrade at the edge of a steep drop where the balustrade has parallel bars spaced to prevent a child climbing through. To an experienced eye, the one with bars arranged

vertically would be seen to be eminently safer than the one with horizontal bars, even though both may comply with building codes. To a small child, the horizontal bars would inevitably present an exciting climbing opportunity - which any parent would recognise with dread. Thus an element intended to prevent falling may be a deathtrap if the elements are arranged without an appreciation of the perception of all users, young or old.

The use of the term 'error' suggests that the fault lies with the user, rather than laying the real responsibility on the provider, reducing the "adverse consequences of accidental or unintended actions" rather than reducing the chance that these could happen. Is it really an 'error' for an individual to find themselves on a route with a slippery ramp without handrails? Although Principle 3 advises "provide warnings of hazards and errors", if we see a sign saying "Mind Your Step" where a change of floor level presents a hazard, we could justifiably respond: "No; it's YOUR step - YOU are responsible for our safety – with a little bit of thought it might not need to be there at all".

Fig 3. Although the sign provides a warning, it also demonstrates a weakness in the design.

Although the sign may absolve the owner of any legal responsibility, the moral responsibility of risk to the user is not necessarily reduced.

When the 7 Principles were being laid down over a quarter of a century ago, the emphasis was largely on designing for people with a range of disabilities, perhaps not anticipating the huge advantage that UD would present to the increasingly ageing populations worldwide. Recognising this fact and, with due respect to the late Ron Mace and his team at North Carolina, we would like to suggest that an added 8th Principle - 'Design for "Reduction of Fear", might be timely. This proposal was described in detail in a paper prepared by this author and colleagues at UCC / MTU and presented at the UD24 Conference in Oslo. (2). In brief, the paper highlighted the fact that whilst safety can be incorporated into many built environments, the individual's perception of danger or risk in many forms can inhibit independent living and increase anxiety in any sector of society.

Fear is an integral part of many creatures' makeup, usefully providing warning signals for avoidance, but where it becomes an inhibiting factor the individual may become over-cautious and hence find that their normal activities become restricted. This can be aggravated by negative experiences, such as a previous accidental fall, but it is not only the fear of physical danger, such as slipping and falling that should be considered; the generation of fear may be due to the inability to cope with a physical, social or emotional challenge, particularly compounded by the environment's ability to

conceal a threat. Lesser inhibiting factors may range widely, from the perception of danger of being mugged in a badly-lit underpass, or for a person with a weak bladder being scared of being unable to find toilet facilities in time, through to a fear of being unable to read instructions on an ATM screen, losing one's credit card or forgetting a pin number. Such fears stem from previous bad experiences and thus encourage the perception that one's physical, mental or emotional abilities may be inadequate to manage these challenges, whether in real or imagined. As well as fear of real danger, less definable fears, lack of security, loss of dignity or being aware of increasing personal limitations, being clumsy, appearing senile or 'being a burden' to others, can inhibit the individual from continuing to lead the full and active life that they should be enjoying.

Causes of fear and inhibition may occur at both macro and micro scale. Urban townscapes with picturesque alleys or luxurious landscaping may be desirable during daylight but, after dark, could suggest the menace of a dark downtown underpass, unless well-lit and overlooked. Places such as pedestrian short-cuts or bus shelters where teenagers may 'hang out' can be inhibiting for anyone to approach alone. The fault may be due to a lack provision by city authorities of anywhere more suitable where young people can meet, just as much as the need for design for 'Defensible Space', outlined in Oscar Newman's book of that title [(3)].

Fig 4. Unfamiliar public spaces can be intimidating

Any element in the built environment should not only provide safety but also reassure users without the stigma of suggesting that this is only for old or disabled users. Handrails are the most obvious example, having the advantage that, being commonplace, do not mark anyone who uses them as being old or incapable. Specifying materials for floor surfaces is also crucial; highly polished floors, where reflection can make even a dry surface appear wet and slippery, can be intimidating. Changes in floor material, where two different tones or degrees of reflectivity occur, can confuse even a person with good vision. In such cases the Fourth Principle: 'Perceptible Information' could be invoked, since it is not only the printed word or recognisable icon that we interpret, but also our 'reading' of any parts of the building that suggest potential danger.

Fig 5.The change of surface and reflectivity in this circulation space causes most users to hesitate; "Is there a step here?"- in fact it is level.

Inhibition can significantly impact how people live their lives. In particular the fear of falling can lead to a person's activity restriction and withdrawal from society. In Graham Rowles' book *Prisoners of Space*(4) cites one individual's fear of falling: "*During the recent bad weather, I didn't move out of the house for three days, as I was afraid of falling".* People with a fear of falling may walk more cautiously, taking shorter steps for increased stability. Such changes in how a person walks may actually increase the risk of falling. Various research studies show that the gait pattern and visual scanning patterns of timid people are significantly different from people without such fear and these walking patterns may actually increase the risk of falling. Additionally, when people experience anxiety, their ability to process the threats cognitively is also reduced, affecting their ability to identify and avoid a hazard. Individuals with such fears may avoid certain activities, particularly away from home, increasing social isolation and decreasing meaningful engagement with others, as well as reducing their physical endurance and muscle strength.

Although there are useful research studies on falls and other inhibiting and damaging hazards, many of the design features that can be applied to reduce such risks are very straightforward if UD principles and code requirements are applied, at both strategic and detail scales. However, although some people may have a fear of falling there are also those who are unaware of potential hazards, particularly in the familiarity of their own home and they may innocently continue to carry out the same activities as they did when younger and more stable. A large proportion of accidents occur in the home, where access and safety codes are not mandatory nor would they be able to pinpoint danger areas. For example, many home maintenance tasks, such as changing light bulbs or cleaning windows, entail climbing on stepladders or even on unsuitable pieces of furniture. We may ask how many people have the foresight to adapt their homes as they age, in anticipation of the risks of falls or inaccessibility?

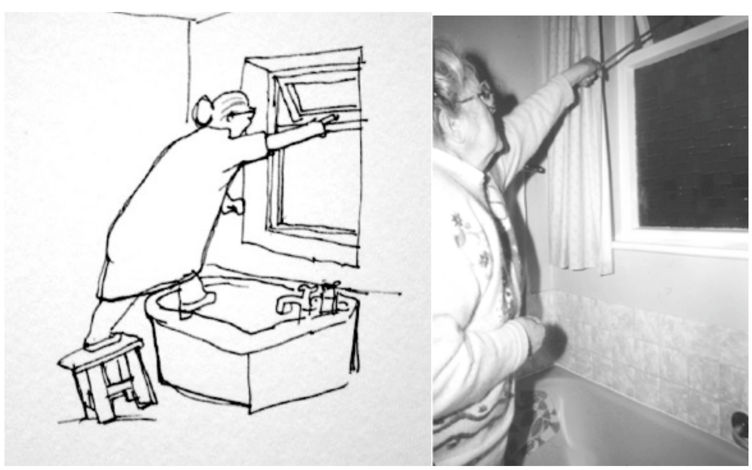

Fig 6. This older occupant habitually risked a fall by climbing on a stool to close a window. Replacing the catch with a stay that could be operated by a short rod eliminated this risk.

Safety measures beyond basic compliance with relevant building codes are appropriate for people of any age or ability, including carers or parents with small children, who need to be particularly aware of the limitations and vulnerability of those in their charge.

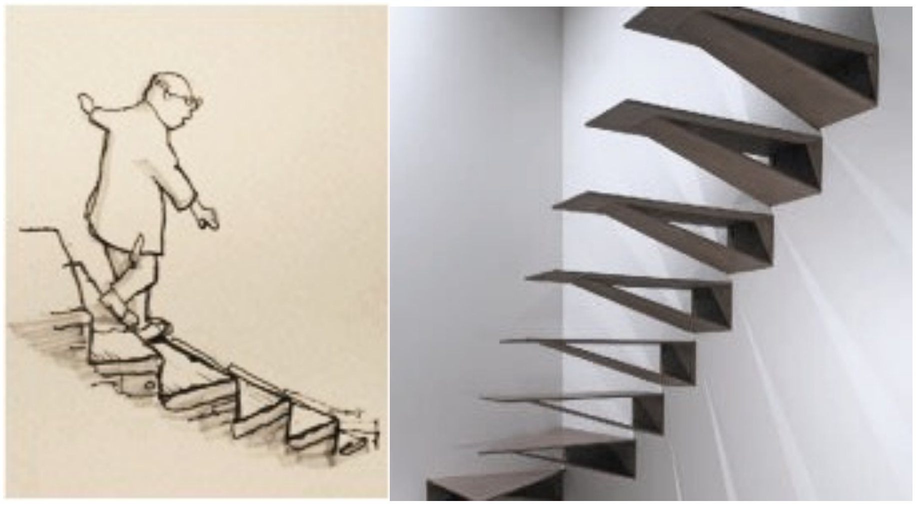

Fig 7. Minimalist staircases can be frightening experiences, as well as being potentially dangerous for people of any age.

One reason often cited as to why building designs are not user-friendly to disabled or less able older people is that they are designed by architects who are young and fit, perhaps with little or no experience of living with grandparents or less able neighbours. As students they may have been presented with exemplary buildings as icons of great design, but in fact may similarly lack empathy for the less able. Glossy coffee table architecture books show seductive interiors with minimalist staircases, often in polished wood with open risers and no handrail. Significantly, human occupants of any age rarely appear in such publications. Many of the precedents designs still held up as being iconic contain classic examples of how NOT to provide safe and accessible environments. These often come from an earlier era when expectations would not have considered

accessibility; for example, several of le Corbusier's famous villas contain impossibly steep ramps, without handrails and with polished concrete surfaces, whilst his iconic Carpenter Center at Harvard has a long and forbidding outdoor ramp. Other classic examples of buildings where a ramp is central to the concept include Frank Lloyd Wright's New York Guggenheim Gallery and Raphael Vignoly's impressive Tokyo Forum, where signs (in English as well as Japanese) actively discourage use of the ramps by wheelchair users!

Fig 8.Ramps in Raphael Vignoly's Tokyo Forum are obviously not there for inclusive accessibility.

Fig 9. As an example of a more recent project that successfully incorporates a ramp compliant with current codes, the Berlin Reichstag renovation by Sir Norman Foster shows that aesthetic quality need not be compromised in the design of an exciting interior. The gradient is gentle and landings are provided at regular intervals.

Conclusion

While the necessity to improve the built environment through the application of UD principles is clear, it is important that this not limited to providing access for people with disability, but that it also encompasses the widest range of ages and abilities. Consultation with the real users and specialists – older people, carers and occupational therapists is fundamental to Universal Design, particularly as ageing populations increase the need for optimally designed built environments. While it is important to demonstrate the advantages of safety through inclusive design, it is also

necessary to point out the latent high cost of not doing the right thing at the right time, both in monetary and social terms. Good design can significantly reduce accidents and consequent hospitalisation and so is a smart investment.

Encouraging greater attention to designing for safety into the UD remit will widen the circle of beneficiaries, with consequent reduction in fear, in all sectors of the population. The greater number of people who are seen to benefit from UD, the stronger the argument for its continuing promotion and the more value it will gain worldwide. Universal Design seeks to include the widest spectrum of users, not just people with a disability or the ageing population. If we acknowledge that fear and anxiety can result from poor design, impacting negatively an individual's life choices, the challenge is how to design to reduce these fears and improving the quality of life for an individual of any age or ability. Experienced designers can identify elements in the built environment that exhibit poor design or have occurred by default, through ignorance or false economy. One hidden quality of UD is that where good design has been seamlessly integrated into the environment it is, to an untrained eye, not easily recognisable and therefore non-stigmatising. Only a designer's informed eye may be able to perceive the inclusive qualities, bearing out an old proverb that says*"the good shoes are the ones you don't know you are wearing".* Achieving this level of expertise requires awareness through experiential exercises, directed observation and dissemination into professional education curricula.

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2. M.F. Storey, Universal Design Handbook, 2nd Edition, McGraw Hill, NY, 2001.

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3. O. Newman, O. Creating Defensible Space. DIANE Publishing. ISBN 978-0-7881-4528-5. 1966

4. G.D. Rowles, Prisoners of Space: exploring the geographical experience of older people. Westview Press. Boulder Colorado USA, 1978

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Sense and Sensibility in Universal Design for Neuroinclusion

Dr Cathy Dalton, Architect, Researcher

"The language around neurodiversity is broken.

Pulled three ways. None of them honest.

Over-medicalised:
patient, disorder, deficit, co-morbidity.

Over-sensationalised:
superpower, gift, talent, supremacy.

Over-politicised:
over-diagnosis, faking it, trendy, playing the system."[1]

The above is a recent LinkedIn post from Ben Branson, neurodivergent advocate and entrepreneur. Design for Neurodiversity, perhaps better described as "Design for Neuroinclusion" is in the welcome process of going "mainstream". It is an important moment for architects and designers to to pause and

[1] Branson, B. 2026, June The language around neurodiversity is broken.Pulled three ways. None of them honest.Over-medicalised:patient, disorder, deficit, co-morbidity.[post] LinkedIn. https://www.linkedin.com/posts/benbranson_the-language-around-neurodiversity-is-broken-share-7469399152351932416-zQqd/

reflect on what "neurodiversity" means, and exactly who and what we are designing for.The idea first emerged from the Neurodiversity Movement of the 1990s, itself a product of the Autism Rights movement. The "neurodiversity paradigm", as proposed by the Australian academic Judy Singer holds that there is no single "correct" type of human brain, and that neurodiversity is an essential form of human diversity. Singer argues that "*biodiversity is essential to ecosystem stability, so neurodiversity may be essential for cultural stability",*and that this perspective can be used "*to advance the causes of people with disabilities"*[2]*.* That last is important to remember in midst the current and often furious debate about what neurodiversity means, who is and who is not neurodivergent, and whether or how, when it comes down to design in the built environment, the distinction matters. The neurodiversity paradigm differs substantially from traditional medical models of disability, which tend to regard any significant deviation from a normative standard as pathological, and seek to "cure" or "fix" it. While the term is most commonly used in relation to people with Autism Spectrum Conditions, it can be extended to include other users/consumers of design, such as people with ADHD, with acquired neurodivergence e.g. through brain injury, also people with dementia, and with intellectual disability."Autism spectrum conditions" include ADHD, dyslexia, dyspraxia, and dysgraphia. About 50% of autistic people have an intellectual disability, but even a decade ago the assumption was that a majority of autistic people did. Landmark reports, such as those by the INCLENTrust, estimate

[2] Singer J. (1999)" Why can't you be normal for once in your life?" From a problem with no name to the emergence of a new category of difference, in Corker M, French S (eds.). Disability Discourse. Buckingham, UK: Open University Press, 59–67.

that nearly 1 in 8 children in India (aged 2 to 9) live with a neurodevelopmental condition.[3]

People born with sensory disabilities are also effectively neurodivergent, by virtue of atypical early brain development. Recent research indicates that rates of autism are much higher in people born blind or visually-impaired: At least one-third (33% to 38%) of blind children meet the diagnostic criteria for autism spectrum disorder, rising to 54-75% for children born completely blind. [4] Some of this is due to behavioural overlap. For the designer, tackling the challenge from the basis of needs and affordances for these users often amounts to the same task as designing well for other neurodivergent users.

Before the DSM-5,[5] published in 2013, the categorisations in the manual meant that people diagnosed with autism could not also be diagnosed with ADHD, and vice versa. Since dual diagnosis became possible, it has become apparent that there isa considerable overlap between the two conditions. The dual diagnosis is referred to informally as "AuDHD"; but this is not a clinical term. At the same time the new diagnostic criteria put people with what used be referred to as "Asperger syndrome"- with no intellectual disability, in the same diagnostic "box" as box as people with "classic" autism, which has also created enormous controversy. Recent and often

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[3] ***Silberberg, D., Arora, N., Bhutani, V., Durkin, M., Gulati, S. (2013) Neuro-Developmental Disorders in India – An INCLEN Study (P04.229) https://www.neurology.org/doi/10.1212/WNL.80.7_supplement.P04.229***

[4] ***de Verdier K, Fernell E, Ek U. Blindness and Autism: Parents' Perspectives on Diagnostic Challenges, Support Needs and Support Provision. J Autism Dev Disord. 2020***

[5] **American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). https://doi.org/10.1176/appi.books.9780890425596**

lively online debate has emphasised a need for more nuanced terminology when it comes to autism, or rather "autisms". There is now research which suggests that there is a genetic basis for this too.[6] The point is controversial, as there is a persistent conflict between clinical and social constructs of autism and ADHD . However attractive and inclusive the "neurodiversity paradigm" might seem, it runs the risk of sidelining people who are severely disabled by autism and related conditions, at the same time neglecting the needs of "high-functioning" people who seem to "get by", but suffer from severe anxiety and other mental health conditions. Designers, however, are not here to diagnose, but to try to address the needs of their users, taking Universal Design as a starting point, with an intention to improve the quality of built environment. We need to equip ourselves to design buildings and places that accommodate the needs of neurodivergent users as far as possible, as well as designing dedicated specialist settings like schools and supported housing. Designing for the senses allows is how we might achieve this, and to inform that process we need to look more closely at the overlaps and the occasional gaps between designing for the different groups who have issues around sensory processing, and sensory and physical disability.

Sensory processing issues are common to both autism and ADHD, and are particularly important when it comes to designing the built environment to "fit" its users. At the same time, addressing sensory needs though design optimises usability for the greatest number of people. In total, it is estimated that in the region of 15-20% of

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[6] Litman, A., Sauerwald, N., Green Snyder, L. *et al.* Decomposition of phenotypic heterogeneity in autism reveals underlying genetic programs. *Nat Genet* 57, 1611–1619 (2025). https://doi.org/10.1038/s41588-025-02224-z

people are "neurodivergent", in clinical terms: more if people with dementia and intellectual disability are included. [7] Autistic people are more likely to develop dementia, as are people with Down syndrome. Neurodevelopmental and neurodegenerative conditions share fundamental disease biology, perhaps explaining the commonalities found in designing for both[8].

Dementia is associated with ageing. New evidence indicates that it is more prevalent in women, not only because they typically outlive men, but because of inflammation post-menopause. Even "normal" ageing results in a deterioration in sensory perception, so that neuroinclusive design can also be considered as "age-friendly". In total, we are looking at around 1 in 4 of our end-users, far too large a cohort to be ignored. This is not design for some "other". It is also what Roger Coleman termed "Designing for our Future Selves", and it would be wise to remember that, even in countries with different demographic profiles to the West's ageing demographic, it is simply a matter of later, if not sooner.

While neurodiversity may be understood as a different way of experiencing the world, this interpretation should not be used to diminish the severity of disability experienced by many neurodivergent people. While nearly half of all creatives identify as neurodivergent (e.g., ADHD, autism, dyslexia), they are clearly not all disabled. Some forms of neurodivergence can confer an advantage in specific careers, where non-linear thinking, hyperfocus and problem-solving are essential skills. Many autistic people do

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[7] ***Dalton, C. (2023), Nov 1 Design for Neurodiversity, at STU Bratislava.***

[8] ***Dalton C. (2016). Interaction Design in the Built Environment: Designing for the 'Universal User'. Studies in health technology and informatics, 229, 314–323.***

have successful careers, especially in IT, while other forms of neurodivergence are common in some professions, including in architecture, engineering and design, but typically, autistic people and people with ADHD have significantly lower rates of employment, and experience a "pay gap". Autistic people also have a substantially higher risk of suicide, and co-occurring mental health issues.

Designing for Neuroinclusion, as an essential aspect of Universal Design may offer a route though the controversy. There is no firm scientific boundary between "neurodivergence" and "neurotypicality". Regardless of that we must include, through design, people who are currently still marginalised from physical participation and visibility in society, and in so doing, make better places for better people, who are better in the sense of experiencing greater well-being. In the visionary 1993 words of Paul Hogan, founder of the (Irish) Institute of Design and Disability, repeated in the EIDD's 2004 Stockholm Declaration, "Good design enables, bad design disables".[9] Design for All, Universal Design, and Inclusive Design are comparable concepts, with slightly differing disciplinary and cultural origins. Universal Design, defined by Ron Mace and his colleagues at The Center for Universal Design[10] is rooted in architecture, product design, engineering and environmental design. It makes some sense in the context of a design discipline whose outputs are often very large in scale, complex, costly, and have a high degree of permanence, to design universally from the outset,

[9] ***Hogan, P., 2004, May 9. The EIDD Stockholm Declaration 2004.EIDD. https://dfaeurope.eu/what-is-dfa/dfa-documents/the-eidd-stockholm-declaration-2004/T***

[10] ***Connell, B.R., Jones, M., Mace, R., Mueller J, Mullick, A., Ostroff, E., Sanford, J.,E Steinfeld, E., Story, M.,& Vanderheiden, G. (1997) The Principles of Universal Design. North Carolina State University, The Center for Universal Design.***

often in the context of an evolving and changing regulatory framework, but even that aspiration must be qualified by the context of architectural practice. Care must be taken in uncritically applying principles derived from one discipline in another, and in not reducing the discourse to mere sloganeering.

At the same time, it should be acknowledged that many architects from many cultures have over time designed and theorised about architecture from a multisensory perspective, from the Mughal architects of the Amber Palace, to Richard Neutra in his seminal work, *Survival Through Design*(1954). The recent upswell in interest in designing for neuroinclusion is in many ways but the latest turn of the wheel, rediscovering knowledge which had been lost or dismissed as anecdotal, or being evidenced now through advances in scientific research, including in the new interdisciplinary field of "neuroarchitecture".

Academic approaches to designing for disabled users, including neurodivergent users, have tended to splinter and differentiate according to disability. This is often not constructive in terms of clearly informing professional design practice and education, especially in relation to designing buildings and environments in the public and semi-public domains, where one size must of necessity fit all. The quality of design in such environments is critical to the visibility, societal participation and wellbeing of neurodivergent users. While personal and dedicated environments (e.g. in Special Needs Education) allow greater opportunities for specialist design, we can apply the knowledge acquired in those contexts to other architectural settings. Often, ostensibly "specialist" design interventions, for what are termed "edge cases" in interaction

design and tech, prove to be of benefit to a much broader cohort. This thinking is at the core of Universal/ Inclusive Design approaches. We do need to take care not to extrapolate from unreliable research, or uncritically from built precedent. The former criticism applies in particular to use of colour in environments for neurodivergent users. The evidence base is currently minimal, but has been used, uncritically, as the basis for general design recommendations. A recent report commissioned by Crown paints (UK) indicates that there is a substantial knowledge gap in the design professions around design for neurodiversity. "*While eight in ten (78%) architects and specifiers see a current knowledge gap in the interior design community, this is not a criticism but a call to action – especially as 79% of architects and specifiers recognise the same knowledge gap exists within their own practices. The findings point not to shortcomings, but to a clear invitation for learning, collaboration and leadership"* [11]. If one accepts that good architectural design has the power to change outcomes for users, then how do we proceed?

A closer examination of design theory, principles and built exemplars for different neurodivergent groups reveals a high degree of overlap in terms of design features; there is further commonality with accepted good practice in Universal Design for sensory and physical disability. This is important to remember when confronted with a constant and bewildering array of articles, opinions and and research of varying quality. The intention of this article and of related lectures and future publications in to "make sense" of it all,

[11]Designing for Neurodiversity. (n.d.). Crown Paints. Retrieved June 17, 2026, from https://professional.crownpaints.com/designing-for-neurodiversity/

so that the information filtered out in the process is of practical benefit to professional designers, to architects, and in design education. The contemporary educational context, however, is that few schools of architecture and design even teach Universal Design at undergraduate level, where it is arguably more appropriately positioned as an essential skill, rather than at postgraduate level. For many of us in the field of Universal Design, understanding how to implement Universal Design, including for neuroinclusion, is a fundamental and essential part of the architect's skillset. No more than Universal Design in general, neuroinclusive design should not be bolted on as an afterthought. If we fail to even attempt to address the needs of one quarter of our end-users, are we even producing good quality designs?

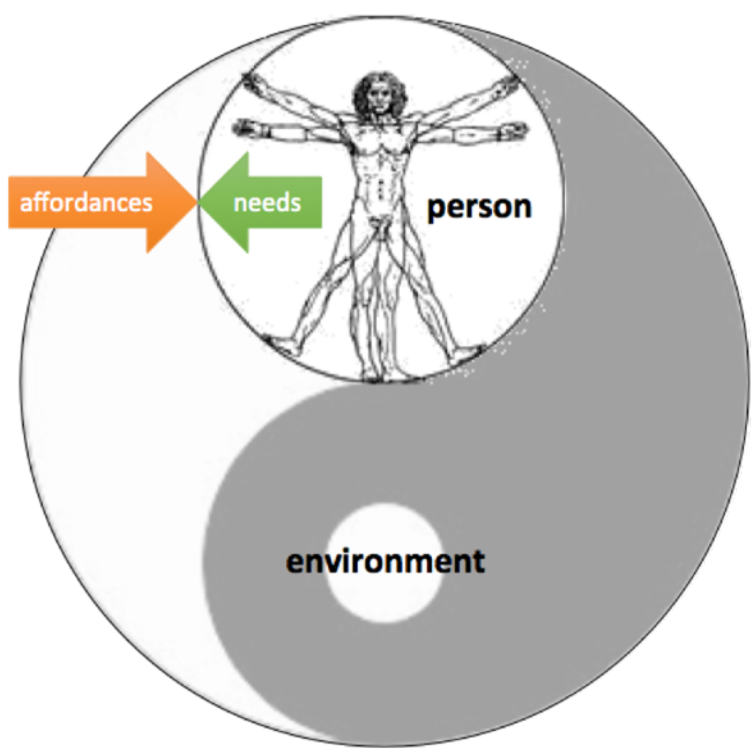

Fig. 1. Congruence/ Environmental fit

Interactionist approaches

One strength of the neurodiversity paradigm is that it is an *interactionist* model, rather than either a medical or clinical model, which are effectively polarised positions. The premise is that the outcome for the end-user is an product of that individual's personal characteristics in constant interaction with their environment. That relationship is dynamic, and evolves over time, an important consideration when it comes to place-making. Inclusion is not only about first encounters, and negotiating the unfamiliar. Individual people vary hugely not only in terms of their individual physical ability, but in terms of sensory perception and cognition. This relates well to principles of congruence and environmental fit in psychology. *(Fig. 1)*. Either the person adjusts to fit their environment, or the environment must be capable of some sort of adjustment to differing individual and collective needs. In the case of users with extreme sensory sensitivity, trial of a nub of neurodivergent conditions, lack of "fit" can lead to extreme reactions such as meltdown, or of avoidance, which is rather less easy to detect. But how to achieve this in a design discipline where the end-product has a high degree of permanence, costs a lot of money, and is made in general of "hard stuff": concrete, steel, stone, timber, ceramic? It's not productive to criticise architecture by self-righteously declaiming that "one size fits one": In the built environment, one size must "fit" many people, with limited exceptions. It is not a pair of trousers, available to buy in different sizes, nor yet a phone app, constantly upgradable. It should also be borne in mind the the standardised sizes for many building elements have been derived over centuries from human measurements, and that has also led to those standards changing

over time. Architecture is not so disconnected from the human scale. The knowledge with which to design well acquiring that knowledge arrives by many routes, including study, practice, knowledge of ergonomics, human perception, personal experience, and "participatory design" which while it is currently popular, has significant drawbacks, and in some cases may be essentially performative. It is far from the *only* means of researching, or acquiring knowledge, and has significant inherent limitations, including being based a very small number of participants, researcher bias, the possibility of manipulating the process toward a desired outcome.

This article aims to focus on the background to designing for neurodivergent users, rather than than on the detail of design interventions.

Sensory processing

90-95% of autistic people have atypical sensory processing, which can result in hyper- or hypo-sensitivity, and sometimes in sensory fluctuation. People with sensory processing issues have trouble organising sensory information. This affects sensory perception. Sensory information can be misinterpreted by the brain, giving rise high sensory sensitivity, or occasionally hyposensitivity to sensory stimulus.There is currently a growing awareness of the fact that women typically have greater sensory sensitivity than men across a number of domains, including higher sensitivity to noise, and significant difference sin thermal perception. Accepted standards may disadvantage them in certain contexts, such as in workplace, where there is no little or no control over personal sensory

environment. The advantage may lie in additional capacity for insight and empathy in women designers.

Sensory sensitivity appears to be the greatest challenge in designing for neuroinclusion in the built environment; while hyposensitivity is also an issue, it is easier to add in sensory stimulus than it is to remove unwanted built-in overstimulation. Sensory sensitivity is also common in ADHD, while sensory-perceptual issues are also an issue in dementia, also contributing to increased stress. Sensory processing issues can include sensory fluctuation, where the intensity of a sensory stimulus can appear to change in terms of individual perception, even where the external stimulus doesn't vary. As a migraineur, I have some personal familiarity with this, during the prodromal phase. Sudden change in sensory stimulus also presents a particular challenge to autistic users: e.g. going from a dimly-lit space into a very bright space, from a quiet space to a noisy, crowded one. Stress appears to be a factor: the more stressed someone is, the more intrusive a sensory stimulus can appear, which in its turn, causes further stress. This applies to most building occupants, but for someone who is neurodivergent, it can lead to overwhelm or even meltdown. Stressors are by no means all environmental: rather, there is an interplay between sensory, cognitive and social stressors.

The "nightmare scenario" for many people with sensory sensitivities is to find oneself in in a large-scale, unfamiliar and crowded public place, where there is too much sensory stimulus: noise, glare, and activity, coupled with insufficient "legibility", and where overstimulus is unavoidable; i.e. where there are no alternatives in terms of negotiating that space, regardless of how essential it is to

do so. Recent devices like noise-cancelling headphones can help, but they come with the built-in drawback that, with exceptions, they also make speech inaudible, and can impact on communication and socialisation if use inappropriately, for example, when used longterm in school settings. The starting-place for ameliorating overstimulus in that scenario is in the design of the built environment: compliance with standards for acoustics in classrooms, careful selection of finishes, adequate space between desks, flexibility in use, quiet spaces. But that is another day's work.

Design for sensory processing issues, and in particular for sensory sensitivity is key to designing successfully for neuroinclusion. It is easier to add in additional stimulus when required, rather than to remove an existing "built-in" stimulus that is too intense. While some advocates for inclusion are wont to proclaim that accessibility should be built in form the outset, this ignores the very nature and vast scale of the built environment, where change necessity happens incrementally and in different geographical locations. Retrofit is a very present reality, and has become more so as the impetus to sustainably re-use of older and unused buildings grows. EU policy aspires to "no net land take"[12] by 2050, and that will inevitably drive the re-use and adaptation of buildings and the public realm on a large scale. Retrofit should not just be about thermal efficiency: in the current international demographic context, it offers a once off opportunity to upgrade at the same time for accessibility, and if organised systematically, to retrofit accessibility on a large scale.

[12] ***European Commission: Directorate-General for Environment & University of the West of England (UWE). Science Communication Unit. [Directorate-General for Environment, University of the West of England (UWE). Science Communication Unit]. (2016). No net land take by 2050?. Publications Office of the European Union.*** *https://data.europa.eu/doi/10.2779/537195*.

Some countries have taken that opportunity; many others including Ireland, have not, to date.

In commercial practice in architecture and interior design, regular retrofit is the norm for workplaces, and in. The hospitality and retail sectors. This offers significant opportunities for designers and their clients to "build in" Universal and Inclusive Design though retrofit, particularly in relation to designing for neuroinclusion, which is contingent on creating a comfortable and supportive sensory environment, which in many cases can be significantly improved by upgrading the specification of finishes.

All buildings are multisensory, in that we perceive them through all of our senses, all of the time, unless we have a sensory impairment. If designers omit to design buildings taking this into account, people with sensory disabilities and sensory processing issues will be the most immediately and severely affected. If we take care in how we design for the senses, all users benefit, firstly from the very basic perspective of usability, and if we design well, with benefits to wellbeing, productivity, and enjoyment, satisfying the old Vitruvian principle of Delight.

The Seven Senses

Traditionally, we were considered to have five principal senses: sight, hearing, touch, taste and smell. There is now evidence of the existence of many other senses. In design for neuroinclusion, two are of particular significance: *proprioception* and the *vestibular sense.* The sense referred to as *interoception* is also an important concept in terms of understanding autistic end-users, , though it is less easy to address directly through design. Designing for neuroinclusion essentially involves designing for the senses.

The *vestibular sense* involves balance and coordination.The vestibular system interprets information in relation to gravity, movementand balance. *Proprioception* refers to the body's ability both to sense where our body parts are, in relationto the rest of our body, and in space, including in motion. It is an automatic process which is impaired in many neurodivergent users. It affects coordination, and our perceived spatial relationshipsto other people using the same space (proxemics). These two senses act to manage how we move through space. *Dyspraxia* is a sensory-based motor disorder associated with autism, involving the proprioceptive and tactile senses. It can present as clumsiness, but also as difficulty planning how to carry out a (physical) task, untidiness, or difficulty in understanding personal and social space. It is not an intellectual disability. Problems with proprioception and vestibular issues can make it difficult for people to navigate the physical environment, especially busy or crowded areas. They are more likely to trip or fall, or bump into other people. This can affect people's social confidence, and lead to their avoiding environments which are likely to cause them the greatest problems. Issues with proprioception and the vestibular sense can can also arise from

injury or infection, .eg. COVID-19 has resulted vertigo for many people, together with other sensory processing issues, including anosmia and "COVID eyes"(photophobia), as well as an increase in neurological disorders. [13]Design principles for people with impaired mobility from physical causes, including disability and chronic pain conditions, overlap with designing for people who have sensory processing issues leading to dyspraxia.

Interoception is a lesser-known sense that helps one understand and feel interpret internal sensations.People who have problems with interoception(typical in autism)may have trouble knowing when they feel hungry/ full, hot/cold or thirsty, and even in distinguishing these physical sensations from emotions.This can make managing self-regulation (including of emotions) a challenge. It also impacts on interpersonal relationships, and on socialisation. Problems with interoception underlie alexithymia.(difficulty processing, recognising and interpreting emotions in self and in others). From the perspective of the individual, they may frequently find themselves in a position where they are unable to express how they are feeling, and sometimes even to process and identify what they are feeling. Is a stomach-ache the really anxiety, or a tummy-bug or just the consequence of a skipped meal? This can happen in people who are not intellectually disabled and who are otherwise capable of verbalisation, but not when it come to expressing their needs. That is in effect what the term "selective mutism" refers to: not to being silent by choice, but rather not always being able to

[13]***Trott M, Driscoll R and Pardhan S (2022) The prevalence of sensory changes in post-COVID syndrome: A systematic review and meta-analysis. Front. Med. 9:980253. doi: 10.3389/fmed.2022.980253***

verbalise ? We need to remember too, that all behaviour is a form of communication, including avoidance or meltdown. Meltdown in someone with a known diagnosis of autism is a great deal easier to spot than avoidance, where there is no diagnosis of a neurodivergent condition, or an undisclosed diagnosis. Avoidance means staying away from places or situations that trigger overload. In addition to avoiding sensory overload, autistic people may also seek to avoid cognitive overload (as may people with dementia) and avoidance of social contact. Lack of familiarity, and poor design and sensory characteristics can tip a user towards overwhelm. Quite apart from the material and spatial characteristics of a place, its other occupants are very often the source of sensory overload. They can't be "designed out", but we can build in in flexibility and choice, at all scales, so that we make places for everyone.

Fig. 2 Overload

In autistic and neurodivergent people, problems with interoception may co-exist with other sensory issues relating to movement,

balance and co-ordination, and physical or sensory disabilities. While the architect may not be able to address this sense directly though design, it can be approached indirectly through provision of quiet or "escape" spaces, (e.g. courtyards, gardens), alternative quieter routes through a building, campus or neighbourhood, (e.g. pedestrian routes) and by designing public or shared spaces so that they are calming rather than unavoidably over-stimulating, It should be stressed that it is human nature also to seek out sensory stimulus: crowds, busy environments, even occasionally, but for many people this is anathema.

Sensory hypersensitivity can manifest itself in being easily overwhelmed by loud noises, or discomfort in noisy settings, by bright lights, (which can cause eye pain and headaches), and strong smells. The last may not be as easily managed by the architect, but (s)she should be aware also of issues with outgassing and chemical sensitivity, which may lie at the root of olfactory sensitivity, especially in autistic people. Some common built features, for example involving parallel vertical lines of grids, can also cause problems with visual perception, or even trigger epilepsy or migraine. Many other people experience high sensory sensitivity, but not in a pathological sense. It is important to know the difference. In the design professions and in design research, they might become advocates for people who experience disabling hypersensitivity, as they possess some degree of personal insight. The devil is indeed in the detail, which will be addressed in future publications and lectures. Not all solutions are architectural e.g. assistive technologies, remote learning, behavioural training, and some

adjustments on the part of the person can help to remediate sensory mismatch between a person and their immediate environment[14].

Other challenges for neurodivergent users can be addressed though consciously tackling the legibility and navigability of the designed environment, by referring to and expanding on the existing knowledge base in relation to wayfinding, traditionally applied to larger complex settings, airports in particular, but also in residential setting of people with dementia. Going forward, designers need to draw first on a clear knowledge of who and what they are designing for moving forwards, but it is always worthwhile looking back occasionally, acknowledging previous knowledge, and good built exemplars.

In many parts of the world, the statutory and regulatory framework necessary to implement Universal and Inclusive Design is relatively new; some of us are privileged to have "grown up ' as designers alongside its evolution, and learned from being part of that journey. There is less and less value, particular in a western society focused on sustainability and re-use, in endlessly proclaiming that Universal Design and accessibility need to be built in from the start. Much of what the architect deals with, either within an existing building or an external or urban context is decades older or more, where universal design was not an initial consideration. Change is slow, because the scale of the required change is enormous, with multiple stakeholders involved, and can often only be tackled by addressing the task incrementally, even where fully supported by policy.

[14] ***Doyle, N.*** **Neurodiversity at work: a biopsychosocial model and the impact on working adults,** ***British Medical Bulletin, Volume 135, Issue 1, September 2020, Pages 108–125, https://doi.org/10.1093/bmb/ldaa021***

Architects and other designers of the built environment can help increase the rate of change by fulling embracing on board the idea of Design for Neuroinclusion, in the way we have embraced sustainability.

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Invisible by Design: Race, Neurodivergence and the Limits of Inclusion

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Introduction

Inclusion, as it is most commonly practised, has a design flaw not only in the architectural sense, but in its very conception. The dominant frameworks through which neurodiversity and disability are understood, communicated and accommodated have been built largely without the participation of Global Majority communities. The result is a version of inclusion that, despite its stated universalism, continues to render groups of people invisible through the quiet, compounding effect of never having been considered in the first place.

A word on terminology, since I am writing from Britain for a readership largely in India. "Global Majority" is a term coined by Rosemary Campbell-Stephens to describe people of African, Asian, Latin American and Indigenous heritage, who together form the overwhelming majority of the world's population and yet are routinely described in Britain as minorities. I use it because it refuses that arithmetic and am conscious that its logic inverts depending on where you are standing: in London I am a local

minority and a global majority, whereas a reader in Delhi or Chennai is both. The analysis still transfers, because the frameworks I am describing do not stay put. Diagnostic instruments, professional standards, inclusive design guidance and the research base beneath all three were built in a small number of Western institutions and exported wholesale, which means that a designer in India may well be working to a set of norms in which the imagined user is no more Indian than the imagined user in a London office. The question of who the default human is does not disappear when the demographics change; it simply becomes harder to see. Nair, Farah and Boveda argue that neurodiversity scholarship has treated the Global North, principally the United Kingdom and the United States, as the centre of knowledge production, has left Indigenous and Southern epistemologies out of the account, and has largely failed to engage the intersection of racialisation and neurodivergence (Nair et al., 2026).

This article argues that authentic inclusion, in environments, systems, services and workplaces, requires an intersectional analysis that takes race seriously as a structural variable from the outset, not as an afterthought. It draws on research, practitioner experience and lived reality to examine where current inclusive design frameworks fall short, why Global Majority neurodivergent people are disproportionately underserved, and what a more honest, systemic approach might look like.

The Inclusion Paradox: Designing for a default human

Universal Design, as a discipline, emerged from a recognition that environments and systems built around a narrow conception of human ability inevitably exclude. The seven principles articulated by Ronald Mace and colleagues at North Carolina State University in 1997 - equitable use, flexibility, simplicity, perceptibility, tolerance for error, low physical effort, and appropriate size and space - offered a framework for designing environments that serve the broadest possible range of users (Connell et al., 1997). These principles remain foundational and important.

Yet the “universal” in Universal Design has never quite been universal. The default human for whom most environments, systems and institutions are designed is implicitly white, non-disabled, neurotypical, male and Western. Inclusive design practitioners must reckon with that directly, because the person for whom accessibility is retrofitted is always already positioned outside the norm. And when that person is also racialised, the distance from the centre multiplies.

Neurodiversity discourse has made significant advances in recent decades, reframing neurological difference as human variation rather than deficit or disorder. That reframing was built collectively, through autistic activists, writers and scholars working over several decades rather than through any single originating text (Botha et al., 2024). The social model of disability, developed through the disability rights movement, similarly located disablement in environments and attitudes rather than individual impairment

(Oliver, 1990). Both frameworks have done a great deal to establish neurodivergent people as equally valid, rights-bearing individuals rather than as stigmatised, less-than burdens on society. Yet both have, in their mainstream applications, defaulted to a particular imagined subject: one whose barriers to inclusion are primarily neurological or physical, without consideration of the compounding effects of race, class, gender and culture.

Race and Neurodivergence: An invisible intersection

The evidence for racial disparity in the identification, diagnosis and support of neurodivergent people is both substantial and deeply troubling, and it is more revealing than a simple account of under-diagnosis would suggest. In the largest study of its kind, covering just over seven million pupils in English state schools, recorded autism prevalence stood at 1.76% overall, with marked variation by ethnicity: highest among Black pupils at 2.11% and lowest among Roma and Irish Traveller pupils at 0.85%, with Asian pupils among the lower groups (Roman-Urrestarazu et al., 2021). The authors name differences in detection and referral as one of the likely explanations. Set that alongside Strand and Lindorff's analysis of ethnic disproportionality in the identification of special educational needs in England, which found Black Caribbean pupils substantially over-represented for social, emotional and mental health needs even after controlling for prior attainment and socio-economic circumstance, while Asian pupils were consistently under-identified for specific learning difficulties and ADHD (Strand and Lindorff,

2018). What emerges is a pattern of sorting: the same child, presenting in the same way, is more likely to be understood as having a behavioural problem in one case and an unmet neurodevelopmental need in the other.

These disparities do not arise from a lower prevalence of neurodivergence within Global Majority communities, nor can they be explained away by the convenient narrative adopted by some institutions in society that Global Majority cultures shun disability and are closed to accepting a diagnosis. Behind them lies a complex web of causal contributors including diagnostic tools developed on and normed against predominantly white Western populations, asking questions which are unrelatable to families from other backgrounds; clinical practitioners who may lack cultural intelligence; community and family contexts which discourage engagement with systems perceived as hostile; and a persistent failure to produce accessible, culturally resonant information for families navigating these systems (Perepa, Wallace and Guldberg, 2023).

For South Asian communities specifically, the intersection of collectivist cultural frameworks, internalised stigma around mental health and disability, and the particular pressures of model minority narratives creates a context in which neurodivergent individuals are especially likely to mask and reach adulthood without ever having had their experience named or validated. The shame associated with difference is itself the legacy of generations of colonial pathologising of non-Western minds and bodies, and it compounds the structural failures of underfunded and culturally illiterate services.

The model minority narrative is itself a diaspora phenomenon rather than a universal one. It describes the way South Asian communities in Britain and North America are held up as evidence that racism can be overcome by sufficient effort, and it operates as a form of praise that permits no difficulty. In India it has no purchase. In Britain it means that a South Asian child who is quiet, compliant and academically capable is read as a success story rather than as a child who is masking, and that a South Asian adult whose hyperfocus produces good work is read as diligent until the day that focus lands somewhere the organisation did not want it, at which point the same trait is reclassified as a problem.

I would never have considered whether I was autistic or ADHD were it not for my children. I was brought up in a traditional South Asian household where girls were expected to conduct themselves in a demure manner, respect their elders, undertake duties in the home, study well and generally be polite and respectful of our community, realising always that we are representing our parents and that any perceived misbehaviour could cast a shadow on our parents' reputations. It was under this guise of understanding that I would conduct myself. I knew how to be respectful, not drawing too much attention to myself and treating others with kindness, respect and deference to their authority, be that through age, knowledge or experience.

It was only after receiving my son's diagnosis and understanding that autism and ADHD are heritable that I started to question whether it was possible that I was too. When I reflect on my past it is very hard to disentangle which

parts of how I present are due to my neurodivergence, which are the social conditioning around how women should present, and which are cultural context and being from a South Asian background.

What I did notice, however, were certain trends. I was regularly told that I just needed to do X or Y in order to be eligible for the next promotion in my workplace, at a point when I was in the top 5% of performance at the company, while I watched white peers with a fraction of the experience and knowledge that I had leapfrog over me into positions of seniority. I found out from them that they had been coached and mentored informally by other senior directors at that organisation who had taken a shine to them. There was no formal mentoring scheme or any such thing going on, simply white people sponsoring more white people to succeed. I had been seen as the conscientious Indian woman who probably could not take on much more because she also had a family. That same narrative was interpreted very differently for my peers from other backgrounds.

Systems that were never designed for us

The experience of navigating educational, healthcare, workplace and legal systems as a neurodivergent person from a Global Majority background involves a particular kind of double labour. There is the labour of managing sensory, social and executive function demands that these systems impose. And there is the additional, largely unacknowledged labour of translating between one's own cultural

and cognitive framework and the one implicitly demanded by the institution.

In educational settings, this manifests in multiple ways. Children who do not conform to the behavioural norms of a predominantly white, neurotypical classroom are routinely read through a lens of defiance or cultural difference rather than neurodivergence. The consequence is that support is withheld, or the wrong support is offered, while masking can intensify to the point of burnout. The disproportionality in the English data bears this out, with some groups of Global Majority pupils repeatedly routed towards categories that describe conduct rather than towards categories that describe need (Strand and Lindorff, 2018).

What I noticed was that my son was seen for his behaviour and not for what was going on underneath, and I had to advocate very strongly for him. I would share examples of the behaviour that I was seeing, which was very positive, and I would train anybody who interacted with him, about autism and how to engage him, as well as which words were his trigger words and how to praise him in a way which landed. I had to slowly coach many people who interacted with him to broaden their lens and see the fullness of him.

I experienced diagnostic overshadowing, where people would only see his autism, so when I raised that I thought he might be Dyspraxic nobody took me seriously. It took four years before anyone would even entertain that thought, and then a further year for me to get support to help him; an

occupational therapist was able to confirm that he did in fact, have gross motor difficulties.

In workplace settings, the picture is similarly complex. The reasonable adjustments framework under the Equality Act 2010 theoretically provides a mechanism for neurodivergent employees to request changes to their working environment or conditions. In practice, the system requires individuals to self-identify, to navigate disclosure decisions fraught with risk, and to advocate effectively for themselves in a context that may already be hostile. For many Global Majority employees, this process is further complicated by the knowledge that raising any form of difference may trigger both racial and disability-related bias simultaneously.

A Black colleague of mine told his manager, having worked with him for eight years, that he was dyslexic. He had not been prepared to have this conversation until he felt he had established his reputation solidly enough that any disclosure would not impede it. When he told his manager, his manager responded to say: "Really? That can't be right. Your work is always of a good standard, not littered with spelling mistakes or anything like that, so it can't be that you are very dyslexic." This effectively shut the conversation down between the two of them.

What my colleague did not get a chance to share with his manager is that for the past eight years he had read and re-read every single piece of communication before it was sent. He had laboured over words and checked grammar and spelling a disproportionate amount of time, through various

tools, before hitting send on any email, even if that email was only two lines. His manager failed to engage in the conversation and dismissed my colleague's concerns, and my colleague was left not feeling seen and certainly not feeling heard.

The environment itself

A neuroinclusive environment is usually understood as a sensory question: lighting that does not flicker or hum, acoustic treatment, materials that do not glare, a quiet room somewhere off the main circulation, wayfinding that does not depend on reading dense signage under pressure. All of that is right and much of it is now well specified yet, what is rarely asked is who can be seen to use it.

A quiet room is available to everyone in a building and is not equally usable by everyone in it. Whether a person will walk into one depends on what they believe will be concluded about them when they are seen going in, and that calculation is not the same for everyone in the organisation. An employee who is already read as difficult to place, already the subject of assumptions about their capacity or their commitment, is weighing a different risk from a colleague who can withdraw for twenty minutes and have it read as focus. The room is identical but the cost of entering it is not.

This has practical consequences for design. Provision that is legible from a distance as a concession will be under-used by exactly the people it was built for, which is one argument for designing respite into the ordinary aspect of a building rather than into a single named room. Multi-faith rooms and quiet rooms are frequently collapsed

into one space, which forces a choice between prayer and sensory recovery and makes both visible to whoever is waiting. Signage and wayfinding tend to assume fluent English and a particular kind of spatial reasoning at once. And the consultation that informs any of this usually reaches the people who are confident enough to attend a consultation, which is a narrower group than the one the building has to serve.

None of this requires an additional standard. It requires the same question asked one layer further down: not whether the provision exists, but who can afford to be seen using it.

Intersectionality as method, not metaphor

Kimberlé Crenshaw's concept of intersectionality, first articulated in the context of Black women's experiences of employment discrimination in the United States, offers a framework for understanding how multiple dimensions of identity and structural disadvantage interact to produce forms of oppression that cannot be captured by examining each axis separately (Crenshaw, 1989). A Black woman's experience of workplace discrimination is not simply the sum of racism and sexism; it is something qualitatively distinct, shaped by the interaction of both.

Crenshaw's framework was built to describe one particular structure, and it has since been taken up across many. Caste is the axis that will be most obviously present to readers of this journal and most obviously absent from what follows. I am not the person to write about it but an intersectional analysis of neurodivergence in India that does not account for caste will reproduce, on that axis,

precisely the error I am describing on the axis of race, and I would encourage contributors who are placed to take it up.

The same analytical rigour must be applied to neurodivergence. A South Asian AuDHD woman's experience of the workplace is not simply the sum of racial marginalisation, gender inequity and neurodivergent difference. It is shaped by the specific way these interact: the cultural scripts about feminine compliance and professional ambition; the model minority narrative that reads hyperfocus as an asset until it becomes inconvenient and then pathologises it; the masking behaviours developed over a lifetime that may make her invisible to both diversity programmes and occupational health assessments. The existing inclusive design literature rarely engages with this complexity.

Inclusive design that takes intersectionality seriously as a method, rather than as a rhetorical gesture towards diversity, must begin at the stage of research and co-design rather than at retrofitting. This means that the communities whose lives are most shaped by exclusionary systems must be present as the architects of the alternatives. It means that lived experience must be treated as a form of expertise, so that practitioners, researchers and policy-makers also examine the assumptions baked into their own frameworks.

Towards neuroinclusion that does not leave us behind

What would a fully inclusive environment look like - a school, a workplace, a healthcare setting or a built space - if it were designed

with Global Majority neurodivergent people in mind from the outset? It would require, at minimum, the following commitments:

First, culturally competent identification and support pathways. This means diagnostic tools validated across diverse populations; practitioners trained in the ways cultural context shapes presentation; and information resources that are accessible to families whose first language is not English and whose relationship to medical and educational institutions may be shaped by historical and ongoing mistrust.

Second, a commitment to co-production rather than consultation. The consistent failure to involve Global Majority communities in the design of services and systems ostensibly intended for them reflects a broader epistemic injustice: the systematic dismissal of certain forms of knowledge as insufficiently expert, universal, or legible to dominant institutions. Miranda Fricker's (2007) concept of epistemic injustice, the wrong done to someone specifically in their capacity as a knower, is directly applicable here. The knowledge held by Global Majority neurodivergent people about their own lives, needs and barriers is routinely dismissed or simply never sought.

Third, organisational cultures that do not require the performance of neurotypicality or cultural assimilation as preconditions for belonging. The concept of psychological safety, widely discussed in organisational literature, must be understood to encompass racial psychological safety as well as neurodivergent psychological safety, and to recognise that for most people these cannot be separated. An organisation that claims to celebrate neurodivergent thinking whilst

maintaining monocultures of leadership, communication and professional conduct is not, in any meaningful sense, inclusive.

Conclusion: Naming what has been left unnamed

Inclusion, to be authentic, must be uncomfortable. It must require those who design, research and advocate within this field to examine who has been centred in their frameworks, who has been consulted and who has been co-opted, and who remains, despite decades of progress, invisible by design. The Global Majority neurodivergent experience is not a niche concern, a footnote to the main story, or a diversity add-on to an otherwise sound framework. It is a profound challenge to existing frameworks, demanding a response at the level of policy and practice, and deeper, at the level of epistemology: of who counts as a knower, whose experience counts as evidence, and whose life counts as the benchmark for what universal design must achieve.

We are not edge cases nor afterthoughts.

Progress in neuroinclusion will only occur once there is acknowledgement followed by action, to actively undo the invisibility that Global Majority people face within systems which purport to include them but which, in actuality, serve only to marginalise their voices further.

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Epilepsy, Climate and the Built Environment: Towards a Neuro-Inclusive Architecture

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Keywords: Architecture, climate, epilepsy, neuroscience, neurodesign, disability, neurodiversity, and neurophenomenology.

Introduction

Architecture is often discussed through questions of form, function, aesthetics, and accessibility. Yet how environments are experienced extends beyond visual perception or physical occupation. Buildings are encountered through the body, shaped by sensory experience, atmosphere, memory, and movement. As Juhani Pallasmaa argues, architecture is fundamentally a multi-sensory phenomenon, understood through embodied experience rather than detached observation[15]. Consequently, the relationship between people and environments cannot be reduced to the physical characteristics of space; it emerges through ongoing interactions between bodies and the environments they inhabit.

Recent developments in neuroscience, neurodesign, and disability studies have expanded understandings of these interactions, drawing attention to the ways environments can influence cognition,

[15] ***Juhani Pallasmaa, The Eyes of the Skin: Architecture and the Senses, 3rd edn (Chichester: Wiley, 2012)***

perception, emotion, and wellbeing. Epilepsy is one of the world's most common neurological conditions, affecting an estimated 50 million people globally[16] , with India accounting for a substantial proportion of this population[17]. Despite its prevalence and increasing interest in the relationship between neurological experience and the built environment, epilepsy remains largely absent from architectural and environmental design discourse. Where epilepsy is addressed, discussions often focus upon safety, risk management, or medical considerations rather than lived environmental experience. This absence is significant. Everyday experiences of epilepsy unfold through continual interactions with spatial and climatic environments, sensory stimuli, and social contexts. Environments become sites through which epilepsy is anticipated, negotiated, and understood, influencing participation, navigation, comfort, and wellbeing.

As a researcher living with epilepsy, my experience of navigating architectural and climatic environments informs the perspectives presented within this paper. This positionality is not presented as representative of all experiences of epilepsy; rather, it provides one situated perspective through which relationships between body, environment, and architecture can be examined. The discussion is further informed by lived experience narratives collected through ongoing doctoral research, enabling consideration of both individual and shared experiences of environmental navigation, adaptation, and participation. Drawing upon neurophenomenology, disability

16 *World Health Organization, 'Epilepsy', WHO Fact Sheets, 7 February 2024 <https://www.who.int/news-room/fact-sheets/detail/epilepsy> [accessed 7 September 2026].*

17 *Senthil Amudhan, Gopalkrishna Gururaj, and Parthasarathy Satishchandra, 'Epilepsy in India I:Epidemiology and Public Health', Annals of Indian Academy of Neurology, 18.3 (2015), 263–277*

studies, and lived experience research, this paper examines epilepsy as a means of understanding relationships between body, climate, and architecture. It argues that epilepsy offers a distinctive perspective on architectural experience because it foregrounds fluctuation, uncertainty, adaptation, and environmental awareness. In doing so, the paper suggests that lived neurological experience constitutes a valuable form of architectural knowledge, revealing dimensions of the built environment that frequently remain unnoticed within conventional approaches to design.

Epilepsy and Emerging Neuro-Inclusive Design

Growing interest in neurodiversity has begun to challenge traditional approaches to accessibility within architecture and environmental design. In recent years, greater attention has been given to the relationship between built environments, sensory processing, cognition, and wellbeing, contributing to the emergence of neuro-inclusive design frameworks. Among the most significant developments is PAS 6463:2022 *Design for the Mind: Neurodiversity and the Built Environment*, which provides guidance for creating environments that respond to a broad range of sensory and neurological processing differences[18]. The guidance recognises that factors such as lighting, acoustics, wayfinding, thermal comfort, spatial organisation, familiarity, and safety can significantly influence how environments are experienced.

[18] ***British Standards Institution, PAS 6463:2022 Design for the Mind. Neurodiversity and the Built Environment. Guide (London: BSI Standards Limited, 2022)***

Importantly, PAS 6463 represents a shift away from understanding accessibility solely through physical access requirements. Instead, it acknowledges that environmental conditions can affect perception, cognition, sensory processing, and wellbeing. Consequently, it expands contemporary discussions of inclusive design towards a more nuanced understanding of human diversity. Despite this progress, epilepsy remains relatively absent from both neuro-inclusive design guidance, climate change policies and architectural discourse more broadly. While the standard addresses a range of sensory and neurological processing differences, discussions of epilepsy frequently remain isolated within medical, clinical, or risk-management frameworks rather than being considered as a source of environmental and architectural knowledge.

This absence is notable because many of the environmental considerations identified within PAS6463, including sensory regulation, thermal comfort, environmental predictability, and opportunities for recovery, resonate strongly with lived experiences of epilepsy. Examining epilepsy through these emerging neuro-inclusive frameworks therefore offers an opportunity not only to broaden understandings of neurological difference within architectural research, but also to extend current discussions concerning wellbeing, atmosphere, and human-environment interaction.

Neurophenomenology and Architectural Experience

Phenomenological approaches have long influenced architectural theory through their emphasis upon embodied experience. Rather than understanding architecture as an object to be viewed, phenomenology considers architecture as something encountered and lived through the body. Experience emerges through movement, perception, memory, sensation, and encounters with the material world.

Neurophenomenology extends these concerns by examining the relationship between consciousness, neurological processes, and lived experience. The approach seeks to bridge subjective experience and scientific understandings of the mind, recognising the value of first-person accounts in generating knowledge about perception and embodiment. Although rarely applied within architectural research concerning epilepsy, neurophenomenology offers a useful framework for exploring how neurological difference shapes environmental experience. Applying neurophenomenology to the built environment shifts attention towards the reciprocal relationship between bodies and spaces. Environments are not passive settings within which experiences occur. Instead, they actively shape perception, behaviour, attention, and bodily awareness. Likewise, different bodies encounter the same environment in distinct ways. Architectural experience therefore emerges through interaction rather than existing solely within either the environment or the individual.

This perspective has important implications for understanding epilepsy. Clinical accounts frequently locate epilepsy within

neurological processes occurring inside the body. While such understandings remain essential, they may overlook the environmental contexts through which epilepsy is lived. The experience of a busy transport hub, a crowded public space, an overheated room, or a brightly illuminated environment cannot be separated from the embodied realities of living with epilepsy. Environmental conditions become part of the experience itself.

Understanding epilepsy through a neurophenomenological lens allows these interactions to become visible. It draws attention to forms of environmental awareness, bodily adaptation, and spatial negotiation that are often excluded from both architectural and neurological discourse.

Epilepsy as Environmental Experience

Epilepsy is commonly represented through the seizure event. Such representations are understandable given the visibility and significance of seizures themselves. However, focusing exclusively on seizure activity risks obscuring the broader environmental dimensions of living with epilepsy. The Global Epilepsy Needs Study (GENS) conducted by the International Bureau of Epilepsy[19] demonstrate that everyday life with epilepsy is more complex than this. Decisions concerning movement, travel, work, social participation, and engagement with unfamiliar spaces frequently require careful consideration of surroundings. My PhD research

[19] *International Bureau for Epilepsy, GENS: Global Epilepsy Needs Study Policy & Advocacy Report (Dublin: International Bureau for Epilepsy, 2026)*

highlights that decisions are rarely fixed but instead respond to changing bodily and environmental circumstances.

This environmental awareness may include attention to lighting conditions, temperature, noise levels, crowding, routes of movement, availability of seating, opportunities for rest, and the accessibility of support if needed. Many of these considerations are not unique to epilepsy. However, experiences of epilepsy can intensify awareness of environmental conditions, generating a heightened attentiveness to the relationship between body and surroundings.

Importantly, this awareness should not be understood solely through frameworks of limitation or risk. Rather, it represents a form of situated knowledge produced through lived experience. People living with epilepsy often develop sophisticated understandings of environmental conditions because these conditions can have meaningful consequences for participation and wellbeing. Through everyday acts of observation, adaptation, and navigation, individuals generate knowledge about how environments are encountered and experienced.

Such knowledge remains largely absent from conventional discourse. Buildings are often evaluated through technical, aesthetic, or functional criteria. Yet experiences of epilepsy suggest that architectural environments are understood not only through what they are, but through how they are lived.

Architecture, Atmosphere and Human-Environment Interaction

A key contribution of epilepsy to architectural thought lies in its capacity to foreground human-environment interactions. Architecture is frequently interpreted through visual representation. Drawings, models, and photographs continue to shape both architectural education and practice. However, lived experience reveals that architecture extends far beyond the visual.

Architecture is distinctive because it is inhabited. Unlike many aesthetic forms, buildings are not simply observed; they are entered, occupied, navigated, and dwelled within. Experiences of architecture unfold over time, engaging multiple senses and producing atmospheres that shape how people feel, act, and relate to their surroundings.

Atmosphere has become an increasingly significant concept within architectural theory because it acknowledges the affective and sensory dimensions of environmental experience. Atmospheres emerge through interactions between material conditions, environmental factors, and human perception. They cannot be reduced to singular architectural elements but arise through complex relationships between bodies and environments.

Epilepsy highlights the importance of these atmospheric conditions. Experiences of temperature, humidity, ventilation, sensory intensity, spatial density, and environmental stimulation may all influence how spaces are encountered. These conditions are rarely experienced in isolation. Instead, they combine to create environmental atmospheres that support or constrain participation.

Understanding architecture through atmosphere challenges assumptions that environments function as neutral containers of activity. Rather, environments become active participants in experience. Temperature alters comfort and concentration. Lighting influences orientation and sensory awareness. Noise shapes attention and cognitive effort. Spatial configurations affect movement, social interaction, and perceptions of safety.

From this perspective, architecture and epilepsy share a comparable dynamic quality. Neither can be understood as fixed or static entities. Both emerge through ongoing processes of interaction, response, and adaptation. This dynamic relationship provides an important foundation for rethinking the role of lived neurological experience within architectural research.

Climate, Variability and the Built Environment

Intertwined with architecture, climate represents another significant yet often overlooked dimension of environmental experience. Weather conditions influence how people move through cities, occupy buildings, and participate in everyday activities. These influences are not experienced equally. Individuals living with chronic, neurological, or episodic conditions may encounter environmental variability in distinctive ways.

Climate introduces a temporal dimension into discussions of architecture. Environmental conditions change throughout days, seasons, and years. Temperatures fluctuate. Light levels vary. Humidity, air quality, and weather patterns continually shift.

Consequently, experiences of environments are never entirely stable. The built environment is therefore not encountered as a fixed entity but as a dynamic condition shaped by changing relationships between bodies, buildings, and climate.

The significance of climate became particularly apparent during research and travel undertaken in India in May 2023. The intensity of heat, humidity, sunlight, urban density, and sensory stimulation generated heightened awareness of environmental conditions and their relationship to bodily experience. Activities that might ordinarily appear routine, such as moving between locations, spending prolonged periods outdoors, participating in public events, or travelling through unfamiliar urban areas, became mediated by considerations of temperature, fatigue, hydration, recovery, and environmental exposure.

What emerged was not merely an awareness of climate as a background condition, but an appreciation of climate as an active participant in environmental experience. Decisions regarding where to sit, when to travel, how long to remain outdoors, and when to seek refuge were continuously informed by changing climatic conditions. These decisions often unfolded unconsciously, becoming embedded within everyday navigational practices. Through this process, environmental awareness operated as a form of adaptive knowledge produced through lived experience.

Importantly, these observations extend beyond individual experiences of epilepsy. They raise broader questions concerning how architectural environments mediate climatic exposure and environmental comfort. In many contexts throughout India, shaded

thresholds, verandas, covered walkways, courtyards, and naturally ventilated spaces perform important environmental functions. Such architectural responses do not eliminate climatic conditions but instead create opportunities for adaptation, retreat, and transition between different environmental states. From a neurophenomenological perspective, these moments of transition are significant. Moving between shaded and unshaded spaces, between conditioned and naturally ventilated environments, or between crowded and quieter settings alters sensory and bodily experience. Environmental transitions influence perception, attention, comfort, and wellbeing. Consequently, architecture participates directly in shaping how climate is encountered.

The relationship between climate and architecture also highlights the limitations of approaches that separate environmental design from questions of health and wellbeing. Discussions concerning accessibility often focus upon circulation, dimensions, and physical access, while climatic and atmospheric conditions remain secondary considerations. Yet lived experiences of epilepsy suggest that thermal comfort, environmental predictability, sensory intensity, and opportunities for recovery may be equally important in shaping experiences of participation.

This observation resonates strongly with emerging discussions surrounding neuro-inclusive design. While standards such as PAS 6463 recognise the significance of sensory environments, thermal comfort, wayfinding, familiarity, and opportunities for refuge, experiences of navigating varied climatic contexts demonstrate how these factors rarely operate independently. Instead, they combine to

produce complex environmental atmospheres that influence how people inhabit space.

Climate therefore provides an important lens through which to reconsider architecture. Rather than treating buildings as static objects, climate foregrounds architecture as a dynamic mediator between bodies and environments. Buildings filter light, regulate temperature, provide shelter, frame movement, and organise encounters with the surrounding world. These functions become particularly visible when viewed through experiences of bodily variability and neurological difference. Recognising climate as part of architectural experience also expands discussions concerning contemporary environmental challenges. As temperatures rise and weather patterns become increasingly unpredictable, questions of heat, environmental comfort, and wellbeing are likely to become increasingly important within architectural practice. While these issues affect all building occupants, they may have particular significance for individuals whose experiences are shaped by fluctuating neurological or health conditions. Paying attention to lived experiences of climate therefore offers valuable insights into the design of more responsive and inclusive environments.

Ultimately, climate reveals architecture as a relational rather than autonomous condition. Environmental experiences emerge not through buildings alone, nor through bodies alone, but through ongoing interactions between the two. Epilepsy exposes these interactions with particular clarity, demonstrating how environmental conditions become integrated into everyday practices of navigation, adaptation, and participation.

Disability and the Unfinished Environment

As Hendren observes, 'disability reveals just how unfinished the world is'[20]. This statement offers a productive framework for understanding the relationship between epilepsy and architecture. Rather than viewing disability as a deviation from a normative body, disability can reveal assumptions embedded within environments themselves. This perspective is particularly useful when considering epilepsy because many environmental barriers remain invisible within conventional architectural evaluations. A building may satisfy accessibility standards, provide adequate circulation, and fulfil functional requirements, yet still present challenges associated with sensory intensity, environmental unpredictability, thermal discomfort, or insufficient opportunities for refuge and recovery. Such conditions are rarely identified as architectural barriers because they are often understood as individual experiences rather than environmental issues.

Hendren's observation encourages a different interpretation. Rather than asking how disabled people adapt to environments, it invites consideration of how environments might better respond to diverse forms of embodiment. Through this lens, epilepsy does not reveal deficiencies within the body but exposes assumptions built into architectural practice. The condition reveals the extent to which environments continue to be designed around expectations of consistency, predictability, and stability. Yet lived experiences of disability demonstrate that bodies are diverse, variable, and continually changing. Conditions such as epilepsy make these

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[20] ***Sara Hendren, What Can a Body Do? How We Meet the Built World (New York: Riverhead Books,2020)***

realities particularly visible because they challenge assumptions that bodily experience remains stable across time and circumstance. Through this lens, epilepsy reveals aspects of architecture that often remain unnoticed. Lighting conditions that appear ordinary may produce discomfort. Overheated spaces may become difficult to occupy. Complex spatial arrangements may generate uncertainty. Environments designed according to normative expectations can become sites of exclusion not because access is physically impossible, but because bodily variability has not been considered.

This observation shifts attention away from individual bodies as sources of difficulty and towards the relationship between bodies and environments. Disability emerges through interactions between embodiment and environmental conditions. Architecture therefore plays an active role in shaping experiences of inclusion and exclusion. Viewed in this way, epilepsy offers valuable insights into the ongoing development of inclusive architectural practice. Disability highlights the ways in which exclusion may emerge through interactions between bodies, environments, and changing circumstances. Environmental factors including temperature, sensory intensity, spatial organisation, and environmental predictability actively participate in shaping how spaces are inhabited, navigated, and understood.

Recognising this relationship does not require architecture to eliminate all forms of difficulty or uncertainty. Rather, it requires acknowledgement that environments are never neutral. They support certain forms of occupation while constraining others. Disability provides a valuable perspective through which these dynamics can be understood and addressed.

Designing for Rhythms

The experiences discussed throughout this paper point towards an alternative way of thinking about architecture. Rather than designing solely for standardised users or fixed conditions, architecture might be understood as designing for rhythms. Rhythms exist within bodies, environments, and climates. They include cycles of activity and rest, concentration and fatigue, movement and pause, stimulation and recovery. For people living with epilepsy, these rhythms may be particularly apparent because everyday life frequently involves responding to bodily and environmental variability. Designing for rhythms does not imply designing specifically for epilepsy. Instead, it involves recognising that variability is a fundamental aspect of human experience. Bodies change across time. Environmental conditions fluctuate. Needs evolve according to circumstance. Inclusive environments therefore benefit from flexibility, adaptability, and sensitivity to diverse forms of occupation. Such an approach moves beyond binary distinctions between accessible and inaccessible space. It encourages consideration of atmosphere, sensory conditions, environmental comfort, opportunities for refuge, and the diverse ways people experience and navigate environments.

In this context, lived experience becomes an important source of architectural knowledge. Through adaptation, awareness, and environmental navigation, people living with epilepsy develop forms of spatial and environmental understanding that are often absent from conventional design processes. Such experiences highlight the value of engaging directly with embodied perspectives when considering questions of wellbeing, neurodiversity, climate, and

inclusion within the built environment. Designing for rhythms therefore involves recognising variability as an ordinary aspect of human life rather than an exception to it. Such an approach would encourage greater attention to atmosphere, climatic comfort, sensory conditions, temporal change, and opportunities for adaptation. It would acknowledge that inclusion is not achieved solely through access to space but also through the capacity to inhabit, navigate, and participate within environments in meaningful ways.

Conclusion

This paper has touched upon epilepsy as a means of understanding relationships between body, climate, and architecture. Drawing upon neurophenomenology, disability studies, and lived experience research, it has argued that epilepsy offers a distinctive perspective on architectural experience by foregrounding fluctuation, environmental awareness, and human-environment interaction.

Rather than existing exclusively within the body, experiences of epilepsy emerge through ongoing encounters with architectural and climatic conditions. These encounters generate forms of environmental knowledge that remain underrepresented within conventional architectural discourse. Attention to lived experience reveals architecture as a multi-sensory, dynamic, and relational phenomenon, shaped through continuous interactions between bodies and environments.

Building upon Hendren's note that disability reveals the unfinished nature of the world, the paper suggests that epilepsy reveals the unfinished nature of architectural environments. Conditions often assumed to be neutral emerge as active participants in experiences of comfort, participation, orientation, and wellbeing. Recognising these relationships expands current discussions surrounding neurodesign, environmental experience, and inclusive architectural practice.

Ultimately, epilepsy offers more than a subject for architectural consideration. It provides a means of understanding how environments are inhabited, negotiated, and experienced. Through greater attention to lived experience, climate, and bodily variability, new possibilities emerge for imagining architecture that responds more carefully to the diverse and changing realities of human life.

Recent developments demonstrate a growing recognition that environments influence neurological experience and wellbeing. Yet epilepsy remains underrepresented within these conversations. By positioning lived experience of epilepsy as a form of environmental knowledge, this paper suggests that neuro-inclusive design can be further expanded through greater attention to fluctuating and episodic conditions. Such an approach moves beyond accommodating difference towards understanding how architectural and climatic environments participate in the production of experience itself.

Jim Harrison retired recently from 18 years teaching and researching at the Cork Centre for Architectural Education, Ireland. Previously he practiced architecture and taught in England, Zambia and Malawi and went on to become Associate Professor in Architecture at the National University of Singapore, moving in 2004 to Queen's University Belfast. In that year he was awarded a LittD (Doctor of Letters) from his alma mater, the University of Sheffield, for his extensive publications promoting Universal Design and design for ageing, including work as a United Nations Expert in the Asia-Pacific region and consultancy to the Singapore government on access legislation.

As an active octogenarian he now feels qualified to write and advise from first hand experience on matters related to inclusive and age-friendly design in the built environment.

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Designing for Design: Creating a Guide on the Design of Inclusive Parks

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Introduction: the Value of Universal Design

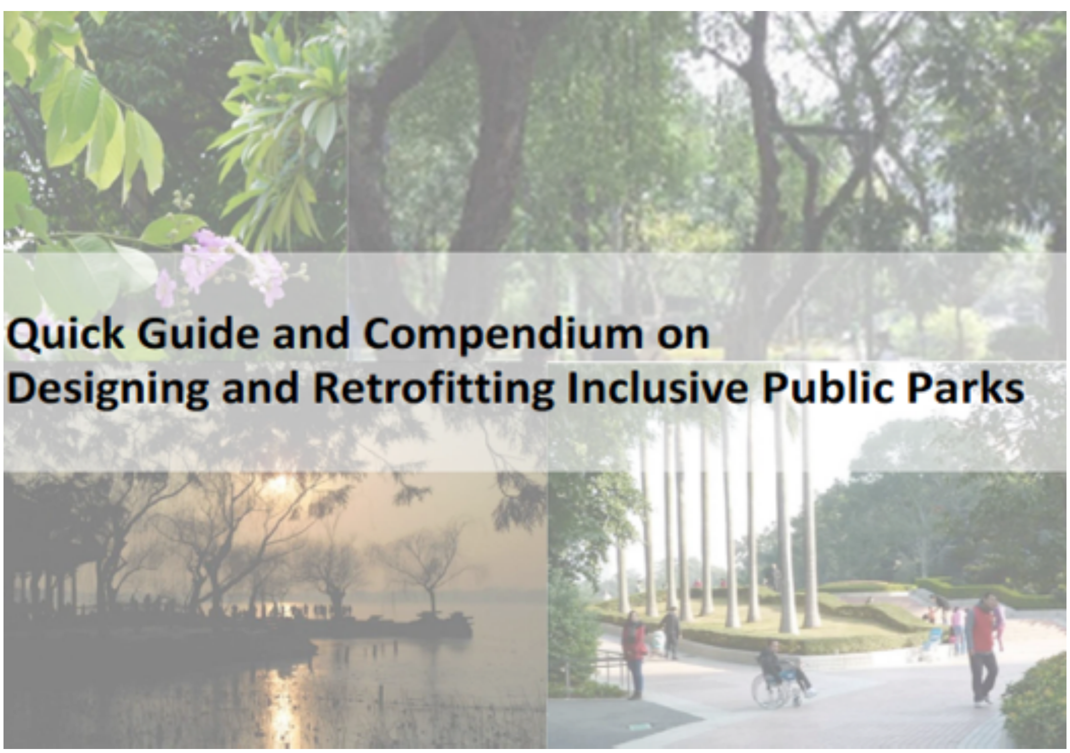
The promotion of designing to meet the needs of the widest range of people often appears to be a challenge. Building regulations, standards and codes go some way towards this, but the power of legislation can only demand that individual elements within the design are made accessible rather than the project as a whole. This can make the requirement for physical inclusion a restriction, rather than a positive incentive towards user-friendly environments, as charted by the team at North Carolina with Ron Mace, who showed thata Universal Design approach canassist designers in creating improved, 'joined-up' and inclusive environments. An abundance of design guides are available on technical matters but how to communicate this information to the non-specialist designer, in a way that 'demystifies' otherwise quite simple ideas, remains a challenge.

In 2021 I was presented with such a challenge when I was approached by contacts at UNESCAP (United Nations Economic and Social Commission for Asia and the Pacific) to prepare a Guide on the design and retrofitting of public parks to Universal Design standards, which could be applicable in countries in the region as

well as internationally. Although not a specialist in landscape design, from my experience, my writings and research on Universal Design I felt confident that the famous Seven Principles could be applied in the creation or adaptation of any physical environment, whether it is a building or public open space. Moreover, I knew that I could call on colleagues and contacts established in this field to add their multi-disciplinary expertise.

The end product, entitled "Quick Guide and Compendium on Designing and Retrofitting Inclusive Public Parks" can be downloaded at *Quick guide and compendium on designing and retrofitting inclusive parks I ESCAP (unescap.org).* In its creation the Guide went through several stages of writing, editing and illustrating.

If you are able to access the Guide then you may be interested in how it was put together, as we will now elaborate in this article.



Scope of the guide: where to start?

When working on any publication, it is as well to consider the potential readership – their interest as well as their existing knowledge of the topic. From this it is easier to decide on what information to include and how this could be presented most effectively. Based on an intuitive idea of the range of potential readers it was felt that it would be instructive to highlight the concept and principles of Universal Design and its advantage over mere accessibility and basic barrier-free code compliance. It was also felt that it was to necessary to emphasize the importance of a strategy on 'joined-up' thinking on inclusion throughout the project, starting from the outset of any design, rather than adding access features retrospectively. Additionally, it was important to remember that the information should be applicable to both new projects and to the retrofitting of existing parks, The first section of the guide "How to Design Inclusive Parks", establishes the principles of Universal Design, and the relationship to the codes and standards that may apply, locally and internationally, in the process of design decision-making.

As in any physical design project it is important to establish the function of the proposal and the range of users who will occupy it – their abilities, needs and expectations, as well as the context in which it is sited, physically and culturally. To this end, the Guide includes a range of user profiles and charts some useful facts related to disability and ageing and the implications of these in design, including the range of assistive devices for people of limited mobility. Aspects such as wayfinding and signage, inclusive

playgrounds, toilet facilities and resting places are illustrated to demonstrate the scope for optimal amenity.

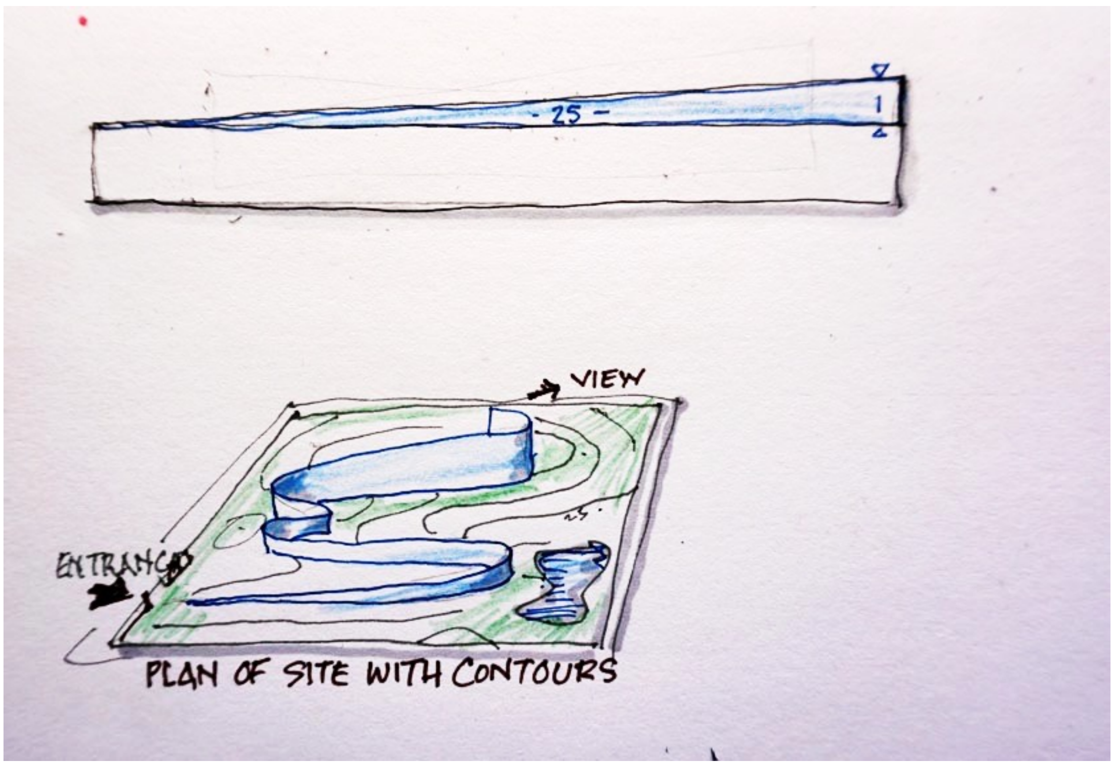
A technique for designing a user-friendly pathway

There is sometimes a misguided belief that an accessible environment is defined through the provision of ramps – elements widely associated with the negative aspects of disability and ageing, but also stigmatizing in their appearance. Where a site or a building's location is not level it is often feasible to plan pathways with a gentle gradient (usually less than 1: 25) on routes that meander through the landscape and do not require the hardware, such as handrails and landings that accompany the ramp itself. In a park, the longer route is often better, if well-planned, since it extends the pleasure of walking and experiencing the planting, water features or views.

Throughout the creation of the Guide, the authors explored new ground in considering how best to convey practical advice to other designers. In the course of thinking how such gentle alternative pathway layouts could be fitted onto a hilly site a simple, possibly unique, method (or tool) was devised, using a cut-out strip to lay onto a scale contoured plan of the site.

Using a site plan to appropriate scale, with spot heights to identify the highest point to be reached, as well as any existing feature that the pathway may reach (a viewing terrace or pond for instance) a triangle is drawn on cartridge paper at the same scale with the acute angle of less than 2.3 degrees (or 1:25 ratio or 4%) representing a

gently sloping pathway. The level of the lowest point on the route (possibly the entrance point) is given Level Zero, angled to the highest, which forms the opposite side of the very thin strip triangle. This is then cut out and laid out on the site plan to explore potential configurations of the route, incorporating any desirable features on the way. More details of this tool are available on page 16 of the Guide itself.



A simple way to explore potential pathway layouts

In many cases, where designers might usefully refer to the information in the Guide, the work most will most likely be retrofitting an existing park, rather than a completely new one. This may include introducing new elements or upgrading existing amenities but, most importantly, to ensure that pathways are accessible and safe for all. Some of the source material for the guide

was generated in response to studying a proposal, by an anonymous design practice, for a new park on a hilly site in an Asian City. From the plans and comprehensive IT-generated perspective images, as a team, we were able to identify a number of instances that appeared to demonstrate a lack of understanding on the designers' part of the opportunities for improvement that UD could give. Although the design comprehensively incorporated accessible features, complying with local codes, in some cases these could have been made more efficient by taking a more holistic view of the layout – particularly in relation to wheelchair-accessible routes. For example, in the given design proposal the park's toilets were located so that they would be approached up a sloping path - then down again by several steps; but to make this wheelchair-accessible a ramp was also necessary. Whilst the design was perfectly accessible and code-compliant, the costly duplication of steps and ramp could have been avoided by siting the toilet block at an accordant level with the entry path or creating a level 'cutting' from the main circulation. Such a missed opportunity is fairly typical, and may come about because the designer is considering the design only on plan, rather than also on section, as well as seeing elements that will make the design more accessible only in isolation.

A built example on improving level access

It is important to emphasise that a well designed 'inclusive' environment is not defined by the number of its ramps or other 'access features', but rather by the way that the designer has made level or gently-graded routes throughout the plan, avoiding the need

for ramps at all. This way of design thinking is illustrated by a real-life example carried out in a small park/garden at the UNESCAP campus in Bangkok. Here an external cross-site circulation route was improved by creating a cutting through the sloping site, rather than improving and extending the existing ramps up into the garden and own the other side; in reality these ramps were too steep and slippery and so decreasing the gradient would have meant extending them and thus significantly reducing the remaining area garden. Thissolution also proved both to be considerably more cost-effective than the separateupgrading of each element, as well as aesthetically more pleasing.

(see p18 of the of the Guide – "Case Study: Garden Route")

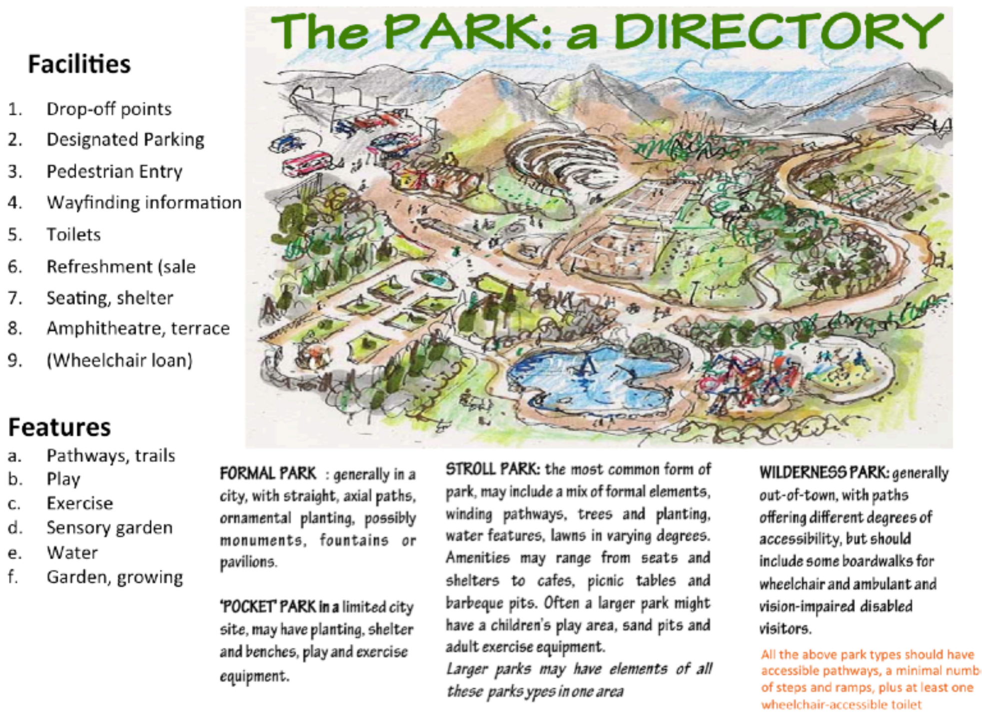
Garden route before upgrading

Below: the solution was to redesign the through-route in the form of a level 'cutting', with one ramp and steps solely as garden access, preserving the area of the garden

The diversity of park design

The value of parks, in different urban and suburban settings, cannot be overstated, providing a 'green lung' for the benefit and welfare of all citizens. It is acknowledged that contact with nature and the experience of open space, even at a small scale, are highly beneficial to the human psyche – sometimes referred to as 'biophilia'. Parks can also offer a variety of beneficial amenities for play and exercise to all generations, both to the individual and to the family, and opportunities for social and cultural exchange.

The last page of Part I includes a checklist for the designer, with overall design points to note, checks on aspects of inclusion and relevance to local context and then a run-down of detail elements to consider.



Part II: Case Studies

In any design we learn from other projects in the world around us, both in what to do or what not to do, translating and re-applying a workable idea in a new context or avoiding or improving upon some aspect that is less satisfactory. Case studies of existing built environments, new or old, may suggest useful design ideas to the designer in developing their own project.

In order to demonstrate the applicability of the design advice given in Part I of the Guide, twelve short case studies of established parks are included, chosen to show a wide range of contexts and park types. These range from small urban 'pocket' parks, through formal and stroll gardens, play parks and wilderness parks. Some of these were created a while ago, since when standards have improved significantly and so the authors have included some suggestions on

improvements that could be made, as well as highlighting the positive and enduring features of each example. These examples were made more valuable through the generous co-operation of their designers in providing the information and this is acknowledged in the Guide.

Case studies: an example

Below is an illustration of the way that the Guide attempts to analyse existing examples, both in their positive as wellas their negative aspects. Some suggestions on how improvements in bringing elements up to higher standards might be made are given.

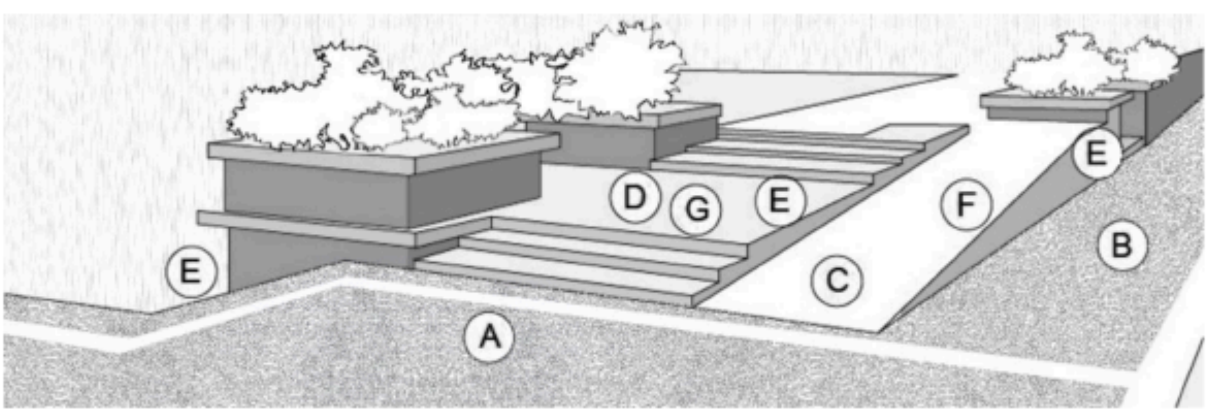
<u>Existing good practice of access elements</u>

A. Tactile strips at level changes
B. Wide circulation routes
C. Accessible ramps
D. Low-riser ambulant steps

<u>Suggested enhancements</u>

E. Add handrails along edges of ramp and path drops
F. Reduce gradient of ramps to 1:20
G. Add contrasting tone at step nosings

Drawing of how ramps and stairs could be improved at Santichaiprakan Park (Drawing: J. Harrison)



3D drawing showing steps and ramps at Santichaiprakan Park. Features A to D are existing access elements of the park, while features E to G are suggested enhancements that could be implemented to enhance universal design standards. (Drawing: K. Busby and N. Hurley)

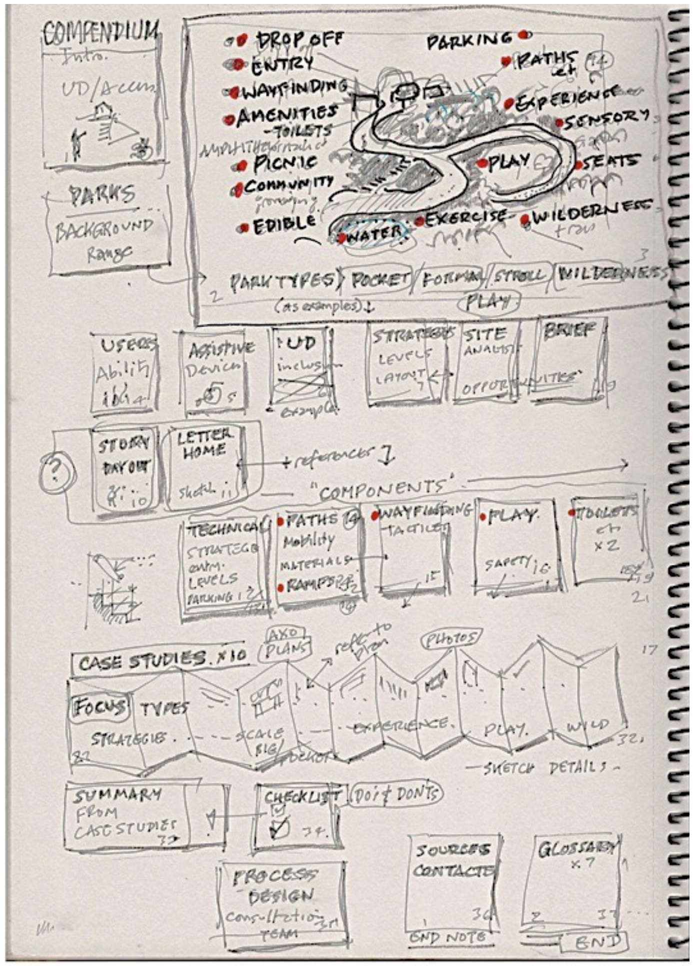
Format and style

One question that had to addressed from the start was: *who would be involved in using information in the Guide?* Documents on codes can often be formal and stiflingly boring to read; to this end, it was decided that the style should be simple and readable, in a format that anyone involved in the design of a park would immediately feel to be useful to them, with clear visual diagrams, photos and freehand sketches, supported by explanatory captions or key dimensions.

Examples, either illustrating a single principle or presenting a more complete case study, are a vital part of reassuring the potential designer of what is possible – and how it might be achieved technically.

The overall format of the Guide was explored through various sketch layout developments, with the contents to be included, their most appropriate sequence and the diversity of coverage. Below is a copy of the authors' initial ideas, possibly in brochure form. In the end the presentation was only online rather than in printed format, but it is printable in successive pages.

The original draft layout



The end product

Parks form an essential part of any city and should therefore be accessible for everyone to enjoy. Making this possible will involve a number of agencies, from the government decision-makers and providers through to the designers and builders, aided by the collective advice of civil-society user groups to ensure an optimal outcome. In any design, but particularly in areas with which the designer may be unfamiliar, it is imperative to consult the users of

diverse age or ability, as well as the experts – professionals who work with people with disabilities, such as occupational therapists and carers, to create an inclusive amenity

Quote

As an Endnote, the Guide includes *'Voices of future park users'*, to give an insight into individual user's experience of any design. These imagined first-person stories help to bring alive the principles presented in the guide, perhaps as extracts from the holiday postcard, written by an imagined visitor with special needs, describing both the good and the unsatisfactory aspects experienced in a hypothetical park. Such imagined 'persona' reports can be a very helpful tool to explore and enliven ideas from the points of view of a wide range of users, not only on UD-related matters but also in any design situation.Such expressions of everyday experiences help to identify what the future users' expectations might be and what to provide to realise these. We, the creators of the Guide, hope that it may prove to give inspiration and effective technical advice in any of your future projects.

The Guide includes acknowledgements to all the individuals involved in its production, but my special thanks must go to the team at the Cork Centre for Architectural Education, University College Cork and Munster Technical University and also to Ms Judy Wee, 'Level Fields' Access Consultant, Singapore.

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When artificial intelligence forgets who it's for

Antonio Vieira Santos

For the past 12 years, I've co-hosted AXSChat alongside Debra Ruh and Neil Milliken. It's one of the longest-running podcasts on accessibility and inclusion. We've spoken to hundreds of guests from across the world, the majority of them people who live with disability every day. A guest from India, a guest from Brazil, a guest from Kenya. People building screen readers, running accessibility consultancies, teaching at universities, fighting for their rights in court.

Those conversations taught me something no amount of corporate strategy work ever could: the distance between what the technology industry promises disabled people and what it actually delivers.

In a recent episode, we spoke to the founder of Lumin, a voice-based email assistant designed with and for blind and low-vision users. He'd co-designed the product with 50 users at the Lighthouse for the Blind in San Francisco. That's the right way to build. It's also rare.

That distance is growing. And artificial intelligence is making it worse.

I want to explain how, because the evidence is now strong enough that the industry has run out of excuses. The failures are documented. The numbers are in. And the people affected have been saying this for years.

The machines that can't see their own users

Artificial intelligence is sold as the next step in making digital life easier for everyone. Voice assistants that understand you. Chatbots that answer your questions. Tools that describe images, read documents aloud, write in simpler language. For disabled people, these could be life-changing. Some of them already are.

Be My Eyes, a free app connecting blind users with sighted volunteers, now uses artificial intelligence to describe what a phone camera sees. Microsoft's Seeing AI does something similar, no account or payment needed. Google's Project Euphonia is building speech recognition that works for people whose speech patterns differ from the norm. These are real, working tools that make real differences in people's daily lives.

The problem is what happens everywhere else.

A blind user testing commercial artificial intelligence chatbots described what happens when they send a message: the screen reader jumps back to the top of the page. Text from the underlying website bleeds into the chatbot's reply. The words "Shop By Category" and "Browse Our Deals" get read aloud in the middle of an answer about something completely unrelated. The chatbot passes every automated accessibility test. A sighted person would never notice. A screen reader user can't get through a single conversation.

In July 2026, the blind user community on AppleVis documented that ChatGPT's newest features, including Deep Research and Agent Mode, were announced to screen readers as static text. Pressing

Enter or Space to select them opened the microphone instead. The features worked fine with a mouse. They were effectively unavailable to anyone using a keyboard or screen reader.

Microsoft 365 Copilot's own accessibility statement, republished by University College London in March 2025, rated the product "partially compliant" with accessibility standards. Documented failures included keyboard navigation that performed no action, a keyboard trap where focus disappeared, and a screen reader that stayed silent when navigating between results.

An academic study at the International Web for All Conference tested how well artificial intelligence tools generate accessible user interfaces: 21,880 assessments across 6 tools and 54 designers. The result: 29 percent compliance. When designers specifically asked the artificial intelligence to make the interface accessible, compliance went down.

The bias built in

The failures go beyond broken interfaces. Artificial intelligence carries the biases of the data it was trained on. And disabled people are barely in that data. A 2024 study from the University of Washington, presented at the Association for Computing Machinery Conference on Fairness, Accountability, and Transparency, tested what happens when you add disability-related credentials to a job application. A scholarship. An award. A panel seat. These additions made up less than 7 percent of the total document. The language

model, GPT-4, ranked the applications with disability credentials lower every time. Training the model on disability-justice principles reduced the bias. It didn't remove it.

This matters because artificial intelligence screening of job applications is now common. A 2021 Harvard Business School study found roughly 75 percent of large enterprises in the United States automate applicant screening. A class action lawsuit alleges that Workday's screening tools discriminate on the basis of disability. A federal judge ruled the tools can be considered an agent of the employer.

Speech recognition still performs badly for people with atypical speech. Research using the TORGO database, which includes speakers with cerebral palsy and motor neurone disease, found word error rates between 60 and 90 percent for people with low-intelligibility speech. For people without speech differences, the same systems scored between 4 and 7 percent. The gap has narrowed slightly. It remains enormous.

Google Research used text-to-image generators to create pictures of disabled people. The same result kept appearing: a person in a wheelchair. When asked for a story about a disabled person, language models produced familiar patterns. The disabled character needs to be rescued. The disabled character is inspirational for doing ordinary things. The disabled character wants to be fixed. A blind person supposedly can't play basketball. The models had never heard of wheelchair basketball.

Researchers at Google ran 19 focus groups with 56 adults with disabilities. When the participants saw the artificial intelligence's

stories and images, they used a phrase that sums up the whole problem: "The bot has a non-disabled mind."

A separate study by Ben Hutchinson and colleagues, published at the Association for Computational Linguistics in 2020, found that text-processing models used for content moderation rated language mentioning disability as more toxic and more negative. The models had learned from the way disability appears in public text, next to words about violence, addiction, and suffering. The effect: content moderation systems can suppress disabled people's own words about their own lives.

A 2026 study by Aktion Mensch, the German disability organisation, with the polling firm Ipsos, surveyed 574 people with disabilities. The findings confirmed both sides of the coin. 73 percent of respondents already used artificial intelligence tools, 42 percent regularly. But 28 percent of those who don't use artificial intelligence said inaccessible design was the reason. The demand exists. The access doesn't.

The price tag

There's a dimension of this problem that rarely gets the attention it deserves: cost.

The most capable artificial intelligence tools now sit behind a monthly payment. ChatGPT Plus costs 20 dollars per month. Microsoft Copilot Pro costs the same. Google's artificial intelligence Pro tier costs 19.99 dollars. Premium tiers run to 200 or 250 dollars a month.

Free versions exist. They run older, less capable models, have shorter time limits, and in some cases now show advertisements. ChatGPT's voice mode, which is the primary way many disabled users interact with the tool, is free but capped at a few minutes per day. When you hit the limit, the conversation ends. For someone who uses voice as their main way of interacting with a computer, that's a functional wall, not a sample.

Specialised assistive technology is even more expensive. The JAWS screen reader, one of the most widely used, costs about 90 dollars a year for a basic home licence and up to roughly 1,295 dollars for a permanent one.

Now consider who needs these tools most.

Across the European Union in 2024, the employment gap between disabled and non-disabled people was 24 percentage points. In Ireland, where I've lived and worked for 20 years, the European Disability Forum measured the gap at 38.6 percentage points, one of the worst in Europe. The National Disability Authority's own figures put the employment rate for working-age disabled people at 49.3 percent in 2022, compared to 70.8 percent for non-disabled people.

The International Labour Organization found a global disability pay gap of 12 percent. Three quarters of that gap can't be explained by differences in education, age, or type of work. In lower-income countries, the gap reaches 26 percent.

Then there's the extra cost of having a disability. In Ireland, government-commissioned research puts this at between 10,000

and 15,000 euros per year. In the United Kingdom, the disability charity Scope found extra costs of about 1,095 pounds per month, equal to 63 percent of household income after housing costs.

A 240-euro annual subscription for an artificial intelligence assistant competes directly with heating, food, and existing equipment. The people who would benefit most from artificial intelligence as an assistive tool are the people least able to pay for it.

We are building a two-tier artificial intelligence system. The capable version costs money. The limited version is free. The people on the wrong side of that divide are the ones the technology was supposed to help.

This pattern repeats a familiar story. Every time a new technology arrives that could reduce inequality, access to its best version gets priced in a way that widens the gap. Television, the internet, smartphones. Each time, we told ourselves the market would eventually fix it. With artificial intelligence and disability, that wait is too expensive and the stakes are too high.

The 299-dollar question

No product captures this tension better than Meta's Ray-Ban smart glasses.

At 299 dollars for the basic Meta Glasses line and 379 dollars for the Ray-Ban branded version, they are the cheapest artificial intelligence glasses on the market. Envision Glasses, the dedicated product built specifically for blind and low-vision users, costs between 1,899 and

2,499 dollars. Apple's Vision Pro costs 3,699 dollars. Samsung's Galaxy XR costs 1,799 dollars. Meta's glasses deliver much of what these expensive devices do, for a fraction of the price.

Blind users are embracing them. A blind writer for ABILITY Magazine described the glasses reading paragraphs aloud as she types, identifying cat-food flavours, and correctly naming her location on a street corner in New York. The American Foundation for the Blind reviewed them and called the experience "magical" for reading menus and mail. Through the free Be My Eyes app, a blind user can say "Hey Meta, Be My Eyes" and connect hands-free to a sighted volunteer through the glasses' camera. Be My Eyes now has over 10 million volunteers supporting roughly 1 million blind and low-vision users in over 185 languages.

The glasses look like ordinary Ray-Bans. They're sold at Target, Best Buy, LensCrafters, and Boots. They don't look like assistive technology. For many users, that matters.

The catch is privacy. And it's serious.

Because the glasses look like ordinary sunglasses, bystanders often don't know they're being recorded. In October 2024, two Harvard students combined the glasses' camera feed with facial recognition software and within seconds pulled up strangers' names, phone numbers, home addresses, and relatives' names. They built it to show what was possible.

In early 2026, Swedish newspapers revealed that footage from Meta glasses, including people undressing and using the bathroom, was

being reviewed by workers at a contractor in Kenya to train Meta's artificial intelligence. A class action lawsuit followed. Meta has also been developing a facial recognition feature called "Name Tag" that would let the glasses identify people by face. After journalists found dormant code for the feature already installed on devices, and after United States senators demanded answers, Meta removed the code. The company had abandoned facial recognition across its platforms in 2021 over exactly these concerns. It appears to be bringing it back through the glasses.

Venues are responding. Pub chains, theatres, and restaurants in the United Kingdom have banned the glasses. New York state courts banned recording-capable eyewear across all 1,240 courthouses. In Germany, the digital rights organisation HateAid filed a criminal complaint seeking a sales ban under the same telecommunications law used against a children's doll with a hidden microphone. The Federal Network Agency says it is monitoring the situation.

The American Foundation for the Blind describes the glasses as "an accessibility tool only by coincidence." They were designed for social media users. The accessibility benefit is real but accidental, and the privacy risk is built into the product's design.

Can you get the accessibility benefits without the surveillance? Researchers say yes. A 2025 study showed visual assistance for blind users can run entirely on the device, without sending footage to a company's servers. A peer-reviewed study at the 2026 Conference on Human Factors in Computing Systems proposed context-sensitive protections: automatic face blurring, location-based camera restrictions, and recording indicators that work

through sound and vibration, not just a small light that only 41 percent of bystanders considered sufficient.

The Centre for Democracy and Technology argues that Meta is using accessibility as cover for a tool that creates real privacy and security risks. The same organisation insists that disabled people should not lose access to useful technology because of how others misuse it. The answer is better design: on-device processing, data deleted after use, no reuse of footage for training, and recording indicators that everyone, including blind bystanders, can detect.

Starting at 299 dollars, Meta's glasses are the most affordable artificial intelligence visual aid available. That price matters enormously when the disability employment gap is 24 percentage points and the extra cost of disability is over 10,000 euros a year. The product is a case study in why accessibility and ethics can't be separated. Getting the price right while getting the privacy wrong helps no one in the long run.

Open source and the question of access

There is another path. Open models, released with their code and technical details available to anyone, have closed much of the quality gap with commercial products. Meta's Llama, Mistral, Alibaba's Qwen, Google's Gemma. These can be downloaded and used without paying a subscription.

Mozilla's Common Voice project has collected over 33,000 hours of speech data in 133 languages, all freely available. Google's Project Euphonia has open tools for building speech recognition that works

with non-standard speech. OpenAI's Whisper, an open speech recognition model, performs well on standard speech and, when adjusted for specific voices, shows real improvement for atypical speech too. The free screen reader NVDA, built by the charity NV Access, is now the most-used screen reader according to the WebAIM 2024 survey. It costs nothing and has community add-ons that connect it to artificial intelligence for image descriptions.

The catch is practical. Running an open model requires technical knowledge and hardware that most non-technical users don't have. The barrier moves from money to skill. For many disabled users, that's a different wall.

The opportunity is real. Open models can be adjusted for specific needs: dysarthric speech, sign language recognition, simplified text. What's missing is money and commitment. Public and charitable funding could turn these open tools into finished products that non-technical disabled users can install and use without help. The raw capability exists. The last step, making it usable by the people who need it, keeps getting skipped.

The rules that were supposed to protect people

Europe has built the strongest legal structure in the world for artificial intelligence and accessibility. The question is whether it's strong enough.

The European Union Artificial Intelligence Act requires high-risk artificial intelligence systems to meet accessibility standards and bans artificial intelligence that exploits people's vulnerabilities,

including disability. The European Accessibility Act, in effect since June 2025, requires private businesses to make digital products and services accessible. Germany put this into law as the Barrierefreiheitsstarkungsgesetz, with fines up to 100,000 euros.

The European Disability Forum called the result a "partial win." The accessibility requirements in the Artificial Intelligence Act apply only to high-risk systems. Most consumer artificial intelligence products, the chatbots and voice assistants and content generators that disabled people actually use daily, fall outside that definition.

Then came the rollback. In June 2026, the European Parliament voted through an "Artificial Intelligence Omnibus" package, 423 in favour, 57 against, that delayed and weakened several protections before they had even taken effect. Broader processing of sensitive health and disability data without individual consent. Equality bodies losing direct access to artificial intelligence documentation. Most high-risk obligations pushed to December 2027.

The German blind and visually impaired association, the Deutscher Blinden- und Sehbehindertenverband, responded with a resolution in June 2026 demanding that artificial intelligence be made inclusive. Their statement said: "Everyone is talking about artificial intelligence, but far too rarely is inclusion and accessibility considered." They called accessibility a "Grundbedingung," a fundamental precondition, not something to add later.

The United Nations Special Rapporteur on disability rights, Gerard Quinn, published a report in 2021 concluding that artificial

intelligence "can be a force for good" if tied to the goals of the Convention on the Rights of Persons with Disabilities. He urged governments to prohibit discriminatory artificial intelligence and to require reasonable accommodation. The Convention has been ratified by 190 countries. India ratified it in 2007. The framework exists. The implementation doesn't.

The Web Content Accessibility Guidelines, the main technical standard for digital accessibility, were written for web pages that sit still. They tell you how to make a button accessible, how to structure a heading, how to provide text alternatives for images. They give no guidance on the accessibility of content that artificial intelligence creates on the fly. They don't address bias in artificial intelligence outputs. They don't cover a chatbot that generates a different interface every time you use it. WebAIM's 2026 report found that 95.9 percent of the top one million web pages still had detectable accessibility failures, at an average of 56 errors per page. That's the baseline, and artificial intelligence is adding complexity on top of it.

What "designed for everyone" should mean.

I keep coming back to a phrase from disability rights: nothing about us without us.

The academic research, the product failures, the biased hiring tools, the speech recognition that doesn't work, the images that reduce disability to a wheelchair, the regulations that arrive too late: all of them share one root cause. Disabled people are not in the room when these systems are designed, built, tested, and launched.

They're not in the training data. Research on disability data in the United States found that out of 30 nationally representative federal surveys, none had a process to make data collection accessible to disabled people. If a survey website doesn't work with a screen reader, a blind person can't complete it. If disabled people can't participate, the data won't represent them. If the data doesn't represent them, the artificial intelligence won't work for them.

Artificial intelligence is built to find patterns in data and to perform best for the most common patterns. Disabled people sit further from the statistical average. An artificial intelligence trained on data that barely includes them will treat their needs as noise. That's the structural problem underneath every failure I've described.

They're not in the design process. A 2025 study of 25 artificial intelligence practitioners at a major technology company found that accessibility work was treated as separate, underfunded, and disconnected from the rest of responsible artificial intelligence work. One practitioner's comment became the study's title: "Accessibility people, you go work on that thing of yours over there."

They're not in the testing. Automated accessibility testing catches some failures. It misses the ones that matter most. A chatbot can score perfectly on every automated test and still trap a screen reader user in a loop they can't escape.

The exceptions prove what's possible. Voiceitt built speech recognition for non-standard speech by working with disability organisations from the start. Google's Project Euphonia collected over 1.5 million speech samples from about 3,000 speakers with speech differences. The Glazko study at the University of

Washington showed that training a language model on disability-justice principles measurably reduced bias. In each case, disabled people were in the data and in the room from the beginning.

What I'd change

After 30 years in technology, 20 of them working on accessibility inside a large European company, and 12 years of conversations on AXSChat with people who know this problem from the inside, my position is plain.

Accessibility is a precondition, not an add-on. If an artificial intelligence feature doesn't work with a keyboard and a screen reader before it launches, it shouldn't launch. If a hiring tool scores disabled candidates lower, it shouldn't be used for consequential decisions. If a speech recognition system has a 60 percent error rate for people with atypical speech, it isn't ready.

Cost must be treated as an accessibility barrier. Assistive technology funding programmes in Ireland, Germany, and the United Kingdom should explicitly cover artificial intelligence subscriptions. The United Nations Convention on the Rights of Persons with Disabilities already establishes assistive technology as a human right. The World Health Organization's 2022 report found that nearly one billion people worldwide are denied access to assistive products they need. Artificial intelligence tools now belong in that category.

Open source is the equaliser, but it needs investment. The free tools that work today, Be My Eyes, Seeing AI, NVDA, depend on corporate partnerships or charity. Community-driven, open fine-tuning of

models for atypical speech, sign language, and easy-to-read text is the most promising direction. It needs public funding.

Standards need to catch up. The Web Content Accessibility Guidelines and the European Accessibility Act were written before generative artificial intelligence existed. Disability organisations need to be writing the new standards, not reviewing them after the fact.

And companies need to stop treating accessibility as a separate concern handled by a separate team. The study of artificial intelligence practitioners I mentioned earlier captured this in its title: "Accessibility people, you go work on that thing of yours over there." Accessibility belongs in the same room as safety, security, and performance, with the same authority to delay a launch.

For India, this matters directly. India has one of the world's largest populations of people with disabilities, over 26 million by official count, and the real number is likely much higher. India's technology industry builds artificial intelligence products used by hundreds of millions of people. The choices made in Bangalore, Hyderabad, and Pune about how to train models, who to test with, and what to charge will shape whether artificial intelligence includes or excludes disabled people across South Asia and beyond.

The German blind association's word was right: Grundbedingung. A fundamental precondition. Accessibility doesn't come after the product is built. It's the condition under which building should begin.

Letter from the Chairman's Desk

By Sunil Bhatia PhD

One day, while travelling through a remote village, I noticed a group of people carrying a dead body on a bamboo ladder. Four men were holding the four corners of the ladder on their shoulders as they proceeded in a small procession along a pathway through dense greenery. The villagers had been using the same route for many years to reach the bank of a nearby river for the last rites.

I noticed that, at the end of the procession, a man was carrying a bag of puffed rice. As he walked, he scattered the puffed rice along the pathway, particularly over the dense green grass.

I went closer to the procession and asked about this unusual practice of throwing puffed rice on the grass.

A wise old man stopped for a moment and explained:

"We throw puffed rice for the villagers who could not join us in time. They can later follow the trail of puffed rice and find the route we have taken. The puffed rice is light and remains visible on the leaves of the grass. It is inexpensive and available in every household."

I was stunned by his simple yet wise explanation. It was a beautiful example of how a product can guide its users. In the absence of a

permanent road, technology, or conventional signage, puffed rice had become a simple and effective wayfinding system.

The incident made me think about the people who are left behind. There may be many reasons: they may not be able to maintain the average speed of the group; they may have physical limitations; they may be emotionally connected to another activity; or they may simply be occupied elsewhere. Yet, if they wish to remain part of the social group, they need a way to find and follow the group.

The villagers had unconsciously designed a system of signals that communicated where the group was heading and enabled those who were behind to catch up.

This small action, completed with wisdom and necessity, represents one of the foundations of human design: guidance for people who are moving from one place to another.

Modern roads developed this principle further. Roads were designed to help travellers reach their destinations safely, avoid accidents, overcome difficult terrain, and reduce the need to stop and ask for directions. As transportation developed, roads also had to respond to the vagaries of weather and withstand increasingly heavy loads. Strength, durability, continuity, and safety became essential requirements.

I have often found roads to be one of the best examples of accessibility and the universal character of design. Whether it is a snow-bound road, a mountain road, or a desert road, the basic principles remain similar. The environment may change, but the needs of the users remain remarkably universal.

A road should provide sufficient width for movement. It should have adequate strength to bear the required loads. It should remain usable for a reasonable distance without unnecessary interruptions. Its design must respond to the conditions of the environment while helping people reach their desired destination safely.

Lanes and service lanes acquired different characteristics. They were not necessarily designed for long-distance travel or heavy loads, but over time they too acquired a universal function: helping people move safely and providing appropriate guidance.

Signage has traditionally played an important role in this process. However, its relevance is changing in modern times because of the increasing presence of GPS and digital navigation systems. Yet the basic human need for guidance has not disappeared. Technology has changed the method; it has not eliminated the need.

A modern designer moved a step further by recognising that people with different abilities also need to move from one place to another through safe and accessible paths. Economic limitations made it difficult to construct entirely separate roads and systems for every category of user. Instead, designers began modifying existing environments so that the same road, path, building, or transport system could be used by people with different abilities.

People who are blind, deaf or hard of hearing, elderly people, and others with different physical or sensory abilities could increasingly be accommodated through thoughtful modifications to the same environment.

Modern life is no longer governed entirely by the rising and setting of the sun. Human activities have expanded beyond the natural rhythm of daylight. We travel, work, communicate, and conduct economic activities without thinking in terms of day and night in the way earlier societies did.

Human beings first learned to manage fire. Fire has two important properties: heat and light. The understanding of light eventually contributed to the development of artificial lighting, from oil lamps to electricity. This changed the basic philosophy of human living.

Earlier, people organised their lives around sunrise and sunset and adjusted their activities according to rain, snow, heat, cold, and darkness. Gradually, artificial light and electricity liberated human activity from some of these natural limitations. We began to work around the clock, regardless of whether it was day or night.

In the beginning, human beings travelled mainly on foot. Therefore, signs and signals were placed close to the ground or within the normal range of vision. Later, people began using domestic animals for transportation. When bullock carts became common, a piece of red cloth could be attached to the rear of the cart to make it visible to others and reduce the possibility of collision.

Some carts carried oil lamps or lanterns so that they could be seen at night. As technology improved, bicycles were equipped with dynamos that generated electricity through the rotation of the rear wheel and provided lighting. Similar principles were eventually incorporated into motor vehicles.

Street lighting was another major development. Roads were no longer designed only for travel in daylight; they also had to support movement after dark.

The modern philosophy increasingly became that darkness is not an absolute condition but, in many circumstances, the absence of light. This way of thinking transformed human life. We learned to capture and store energy from sunlight for later use. We learned to store water in dams and use its fall to rotate turbines. We learned to harness wind through windmills and turbines.

Human beings gradually integrated these sources into networks intended to provide a continuous and reliable supply of energy.

Yet many of these principles are not entirely new. Water power was known to earlier civilisations. The falling water of mountains and rivers was used to rotate two circular stones for grinding wheat into flour. This reduced manual labour. Similarly, boats were designed to move across the sea by harnessing the power of the wind.

Human progress, therefore, is not simply a story of new inventions. It is also a story of observing nature, understanding its properties, adapting them to human needs, and gradually developing systems that reduce hardship.

This simple incident of puffed rice also made me think about an argument made by some anthropologists: that the beginning of human social life can be traced to the discovery of a healed broken femur. The argument is that when a person's leg bone is broken, the individual needs a long period of rest and cannot obtain food or protect themselves without assistance. Therefore, another person

must provide food, care, and protection. In this interpretation, caring for an injured person became one of the foundations of human society.

I look at this question somewhat differently.

Being born blind or with another disability is a biological phenomenon. Human beings have not always had the technology to prevent or predict such conditions before birth. After a child's birth, however, families and communities have historically cared for children with disabilities to the best of their ability.

People used whatever resources and technologies were available to protect vulnerable members of their communities. They provided food, shelter, companionship, and physical assistance. Their motivation was not necessarily economic. It was often emotional, social, and deeply human.

Therefore, I do not believe that we need to imagine an artificial situation such as a broken femur to establish the foundation of social life. The need to care for vulnerable people already exists naturally within human communities.

People with disabilities have always been part of human society. The difference is that modern society has gradually developed technologies and systems that allow them to participate more independently.

Modern people have also realised that the characteristics associated with blindness, helplessness, or inaction can emerge during times of crisis, even among people who normally have full physical and mental abilities.

A very small number of people possess the extraordinary strength to overcome a crisis independently and find their own way out. The majority, however, become vulnerable when familiar systems fail. In a crisis, human beings can behave in ways that remind us that, despite our advanced technologies, we still carry within us the instincts of primitive human beings.

Modern society therefore tries to communicate an important message:

"You are not alone. We are with you in this crisis."

Design has an important role in communicating and implementing this principle.

We first try to prevent dangerous situations through good design. Road dividers, warning signs, traffic signals, protective barriers, accessible pathways, and other systems are designed to reduce the possibility of accidents.

When an emergency nevertheless occurs, society has developed systems to provide support: ambulances, hospitals, emergency communication, life-support systems, rescue services, and other forms of assistance.

Our objective is to behave as modern human beings using the technologies available to us. We attempt to anticipate crises and prevent them from occurring. If a crisis does occur, we try to manage it in the best possible manner under the circumstances and protect human life.

This requires an integrated approach involving technology, human resources, design, and management.

The journey from steps to ladders, from ladders to ramps, and from ramps to escalators represents the continuing human search for accessibility and safe movement. Each development removes a hurdle that previously existed in people's lives.

I would call this the "journey of removing hurdles faced in life."

The distinction between day and night, combined with the development of the commercial balance sheet, has also produced a new kind of world order. Economic productivity has increasingly influenced the way human beings use both physical and mental strength.

Domestic animals are sometimes no longer treated primarily as living beings whose labour helps humans. Instead, they may be treated as units of production and profit.

For example, hens may be kept under artificial light to manipulate their perception of day and night and increase egg production, rather than allowing them to follow their natural biological rhythm.

Similarly, when a cow refuses to give milk, humans may use artificial means to stimulate lactation. Male calves may be castrated to prevent the development of sexual hormones and aggressive behaviour. These practices are often accepted because they are considered economically useful.

We have gradually become insensitive towards living beings that do not provide commercial benefit.

I once heard a forest officer say:

"Lions are surviving because of tourists. Once there are no tourists, lions may be killed for other benefits and small commercial gains."

His statement disturbed me because it reflects a troubling reality: sometimes we protect nature not because we respect life, but because nature has acquired economic value.

This acceptance has lowered our sensitivity towards exploitation. We may see someone being exploited or compelled by unfair circumstances and simply accept it as part of life because the arrangement contributes to the commercial system.

A manual rickshaw puller may physically pull passengers along with the weight of the rickshaw, while passengers justify the arrangement by saying, "We are paying for the service."

The existence of prostitution also raises difficult questions about the relationship between economic necessity, human vulnerability, and exploitation. Despite calling ourselves modern human beings, we continue to permit situations in which biological needs and human vulnerability can become sources of livelihood and commercial exploitation.

Our mindset has been shaped by this system.

We are often afraid of stepping into darkness. This fear can also contribute to what may be called hostile design: environments that discourage, restrict, or exclude people rather than supporting them.

We are no longer in love with darkness in the way primitive people may have been. We have become increasingly dependent on artificial light.

At the same time, we may be losing our curiosity about the other side of darkness—the unknown, the mysterious, and the unexplored aspects of the world.

The more darkness we perceive, the more frightened we become. And perhaps, metaphorically, the more darkness we create in our social systems, the more we become capable of closing our eyes to exploitation.

Our eyes are gradually becoming shutters. We may see someone being exploited in front of us and still ignore it, telling ourselves that this is simply one way of living.

This is where design must go beyond convenience.

Design cannot be limited to making movement faster, buildings more efficient, roads wider, or products more profitable. Design must also ask a deeper question:

Does the system we create respect human dignity and the dignity of other living beings?

The small trail of puffed rice in a remote village therefore becomes, for me, much more than an interesting local practice.

It represents an early form of inclusive guidance.

The person scattering the puffed rice was thinking about someone who was not yet there. He was designing for an absent user.

That is a profound principle of design.

Good design anticipates the needs of people who may not be present at the moment of design. It thinks about the person who arrives

later, the person who is slower, the person who cannot see, the person who cannot hear, the person who is elderly, the person who is injured, the person who is unfamiliar with the environment, and the person who may be facing a crisis.

The villagers did not have GPS, digital maps, illuminated signs, or sophisticated communication systems. Yet they had understood one fundamental principle:

A person who is left behind should not be lost.

This principle is at the heart of Universal Design.

Universal Design is not simply about creating special facilities for particular groups. It is about creating environments that can be understood, accessed, and used by as many people as possible.

The journey from puffed rice to GPS, from a red cloth on a bullock cart to modern vehicle lighting, from oil lamps to electricity, and from steps to ramps and escalators is therefore not merely a technological journey.

It is a journey of human imagination.

Every generation inherits problems from the previous generation and attempts to remove some of the barriers. Sometimes the solution is extremely simple. Sometimes it requires sophisticated technology.

But the underlying objective remains the same:

to help people move, participate, survive, communicate, and reach their destination safely.

I am thankful to Dr. Cathy Dalton, an architect and researcher with a career-long involvement in Universal and Inclusive Design, for accepting our invitation to serve as Guest Editor. Her work advocates inclusion through design and research. Her current work focuses on Design for Neurodiversity and Sensory Design as critical aspects of Universal Design, particularly in relation to existing practices and standards.

I believe that serving as Guest Editor may also have been a new experience for her. She has done complete justice to the role and has invited authors of her choice from different areas of design.

I am particularly pleased to find that many of the articles are connected with neurodiversity and related areas. The ways in which these subjects are explored and presented promise to be a valuable and enriching experience for our esteemed readers.

Perhaps this is another form of the same journey.

Enjoy reading.

With Regards,

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Forthcoming Issues

October 2026 Vol-21 No-10

Dr Arthi Manohar*is a Senior Lecturer, Programme Director for BSc Product Design, and EDI Champion at Brunel Design School, Brunel University London. An interdisciplinary design-technology researcher with over twelve years of experience, her interests revolve around exploring design as an inquiry in complex situations. Specifically, her research focuses on applying creative and unconventional methods to investigate the interplay between social design and technology to*

enhance community creativity, responsiveness, and reflection. Her work spans participatory design, co-design, human-computer interaction, and inclusive design.

She holds a PhD in Digital Product Design from the University of Dundee, where her doctoral research formed part of the EPSRC-funded Digital Economy project TOTeM, and she has been awarded multiple research grants from EPSRC, AHRC, and MRC, with projects spanning trust in IoT, AI accessibility, assistive technology for wheelchair users, and privacy in FemTech applications.

November 2026 Vo-21 No-11

Nuno Sá Leal

PhD - University of Barcelona, Master in Design and Marketing - University of Minho and Degree in Equipment Design - ESAD.

Researcher at UNIDCOM/IADE.

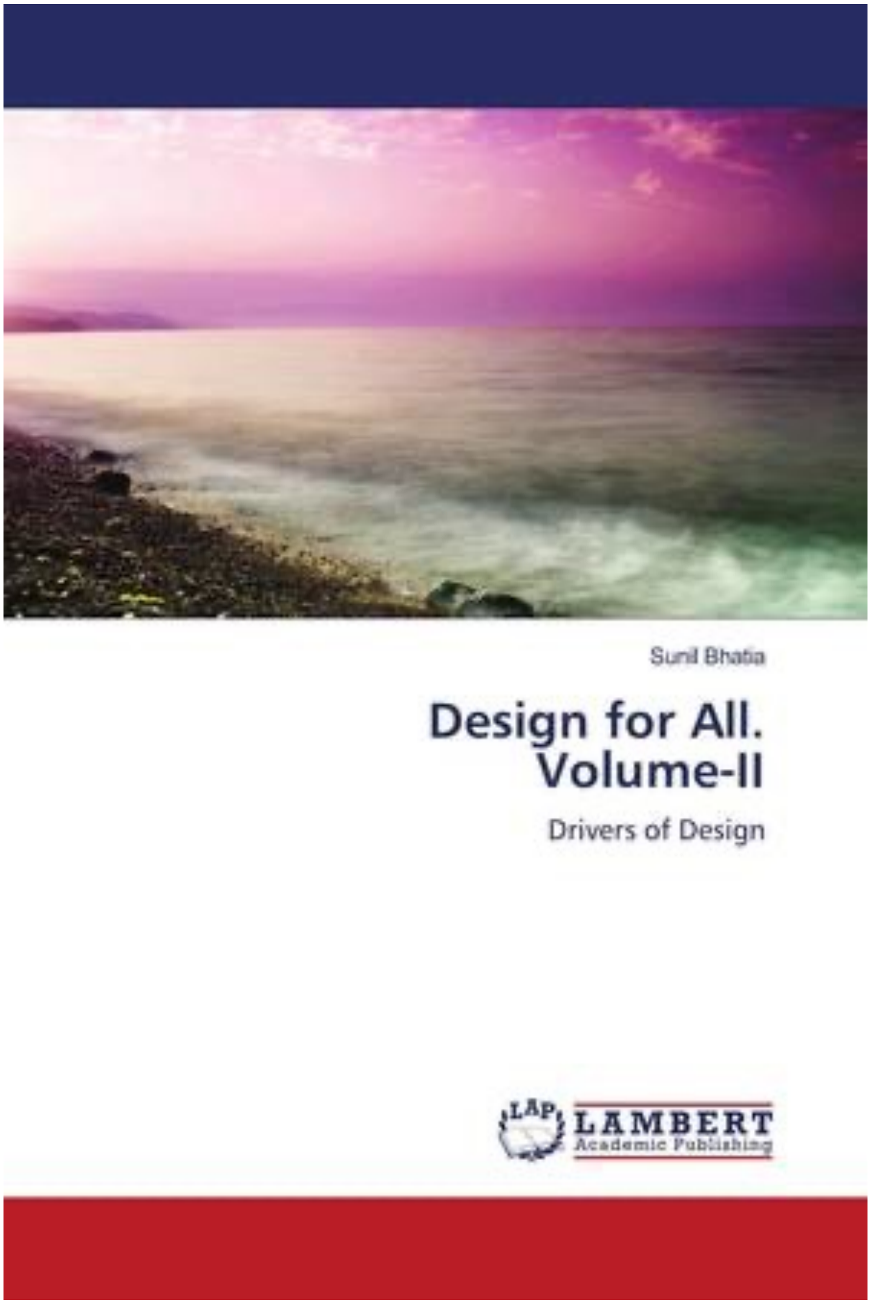
Course Leader of the BA design course at the London School of Design and Marketing LSDM.

He is a member of the Board of EIDD Design for All.

He is president of the Portuguese Association of Designers.

He is the Ambassador of "Fibernamics Green", University of Minho.

New Books



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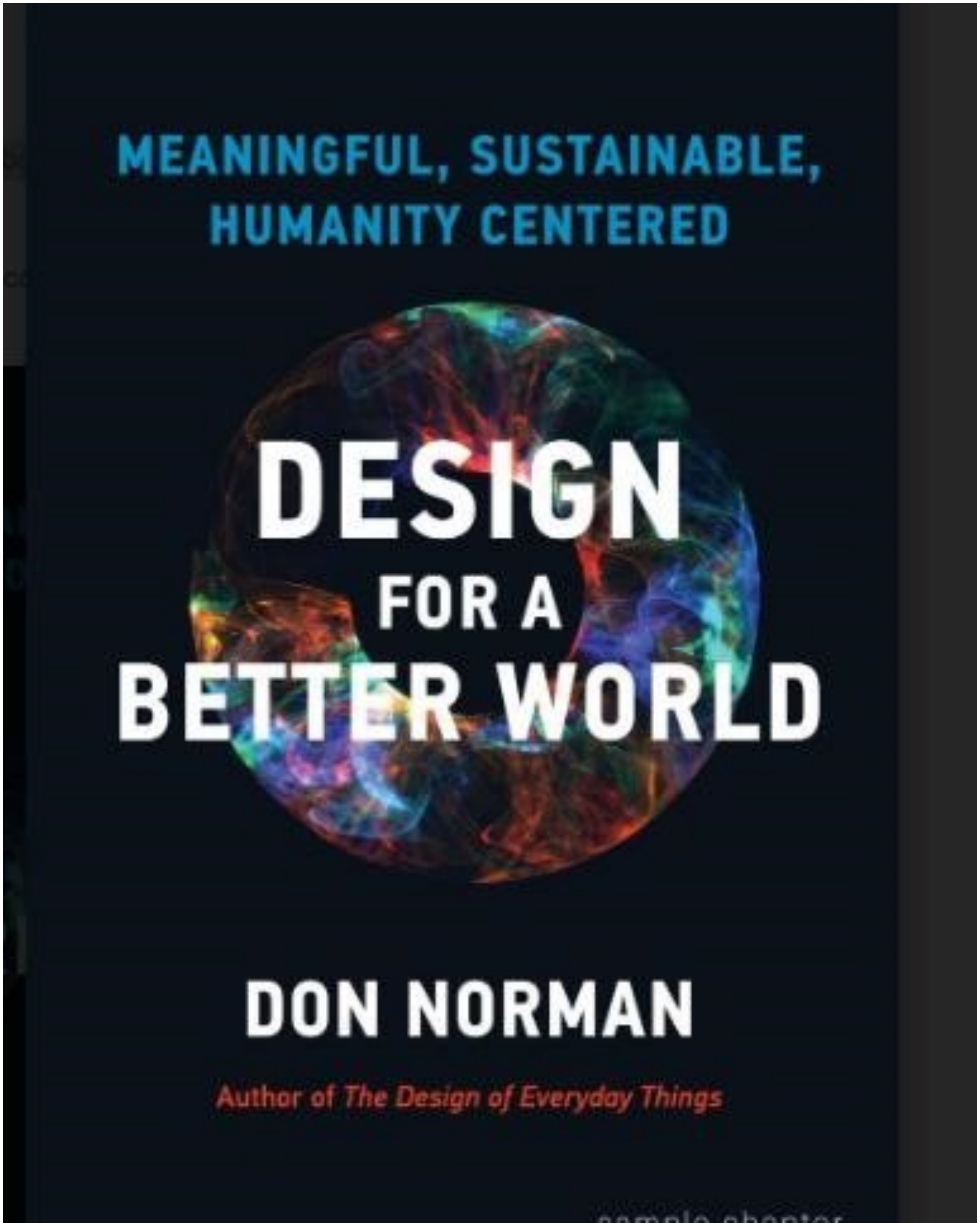
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DON NORMAN
Author of The Design of Everyday Things

News

1. What neurodivergent design can teach every workplace

Kayla Desper, NCARB, Architectural Graduate, Design Collaborative, explores how workplace design can go beyond physical accessibility to support neurodivergent individuals through universal design principles, enhancing comfort and productivity for everyone.

When we think about workplace accessibility, ramps, elevators, and automatic doors often come to mind. Those features are essential, but accessibility goes beyond physical mobility.

For many people, navigating a workplace involves challenges related to attention, sensory processing, communication, or wayfinding, and those needs are often overlooked in traditional office design.

While completing my architecture thesis, I explored how design strategies that support neurodivergent individuals can improve workplace comfort for everyone. What started as an academic project ultimately changed how I think about architecture. I came to realize that when we design for a broader range of human experiences, we create spaces that are more welcoming, intuitive, and adaptable for all.

Rendering courtesy Design Collaborative

Accessibility Isn’t Only Physical

When I began my thesis research, I expected to focus on educational environments. But as I dug deeper, I discovered an even greater opportunity in the workplace.

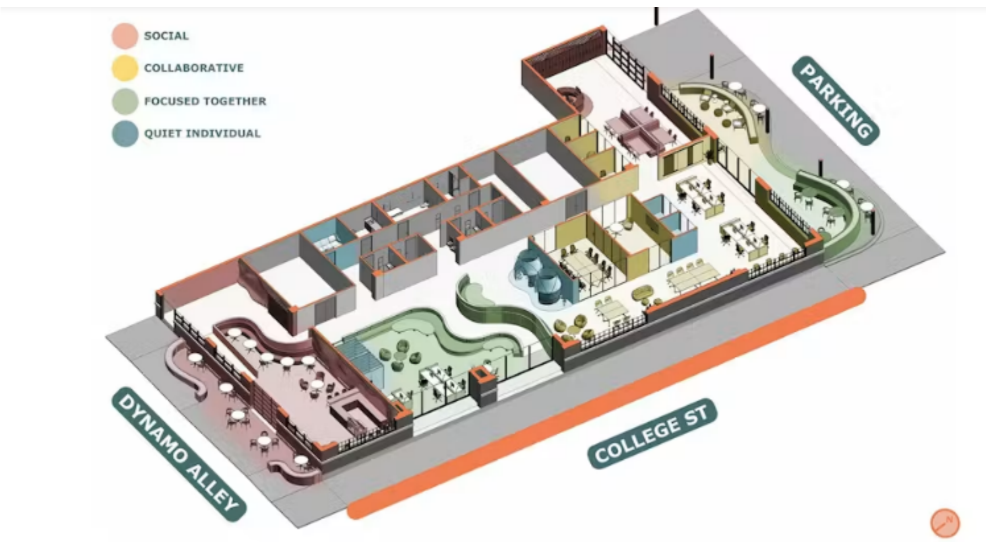
Many neurodivergent individuals, including people with ADHD, autism, or dyslexia, receive accommodations and support throughout their education. Once they transition into the workforce, many of those supports disappear. Yet the need doesn’t.

That realization reinforced my belief that people-first workplaces begin with understanding how people experience space

differently and asking: *How can workplaces be designed to better support the diverse ways people think, process information, and interact with their environment?*

The answer isn't creating separate spaces for different users. It's embracing universal design and creating environments that improve the experience for everyone.

Rendering courtesy Design Collaborative



Clear Spaces Reduce Cognitive Load

One of the first concepts I explored was wayfinding.

When people think about wayfinding, they often think about signs. In reality, successful wayfinding starts with the building itself. Clear circulation, visual landmarks, organized layouts, and intuitive transitions all help people understand where they are and where they're going.

For my thesis project, I reimagined an existing industrial building as a community workplace. I developed color-coded zones,

recognizable landmarks, and a clear organizational structure to make navigation feel intuitive instead of overwhelming.

These same principles apply to workplaces of every size. When employees or visitors don't have to spend mental energy figuring out where to go, they can focus that energy on their work instead.

Rendering courtesy Design Collaborative

Rendering courtesy Design Collaborative

Choice Creates Comfort

One lesson stood out throughout my research: there is no single "right" way to work.

Some people thrive in collaborative environments filled with conversation and activity. Others do their best work in quiet, distraction-free settings. Most of us move between those needs throughout the day.

Rather than designing one type of workspace, I explored how a workplace could offer choices. My concept included social gathering areas, collaborative workspaces, quiet individual zones, adaptable

meeting rooms, outdoor work areas, and flexible furniture that could be rearranged as needs changed.

Providing options allows people to choose the environment that best supports the task at hand. That flexibility doesn't only benefit neurodivergent employees. It creates a workplace that responds to everyone's changing needs.

Rendering courtesy Design Collaborative

The Senses Matter More Than We Think

The built environment constantly communicates with us through light, sound, texture, and materials—principles that align closely with WELL Building Standard.

Natural daylight can improve comfort and mood. Thoughtful acoustics reduce distractions. Plants and views outdoors create moments of restoration during the workday.

Interactive materials and varied textures provide sensory experiences that make spaces feel more engaging and memorable.

During my thesis, I incorporated features such as biophilic design, acoustic treatments, interactive walls, adaptable furniture, and a variety of seating options. None of these elements were intended to serve only one group of users. They were selected because they offer people more ways to engage comfortably with their environment.

Photo courtesy Design Collaborative

Designing for People, Not the Average

Architecture has the power to shape behavior, emotions, and everyday experiences. As designers, it's easy to think about creating spaces for the "average" user. But the reality is that there is no average.

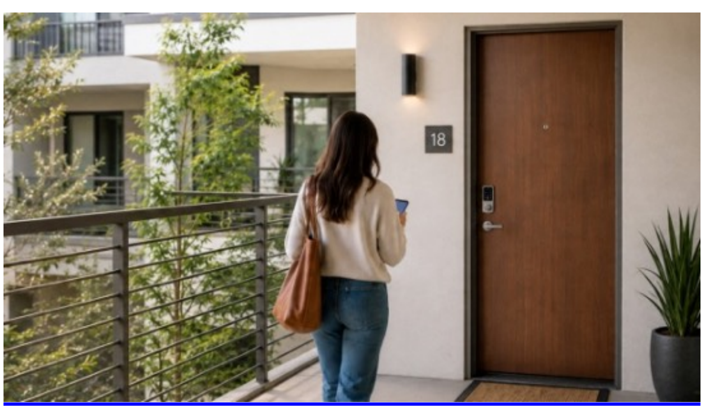
Every person experiences the built environment differently.

Designing with neurodiversity in mind challenged me to think beyond minimum accessibility requirements and consider how architecture can remove barriers before they become obstacles. It reinforced that inclusive design isn't about adding special features at the end of a project. It's about asking better questions from the very beginning.

When workplaces prioritize clear wayfinding, flexibility, sensory comfort, and user choice, they become more than functional spaces. They become environments where more people can feel comfortable, focused, and supported.

For me, that's what thoughtful design is all about—not designing for the default, but designing for people.

Every workplace is different because every team is different. If you're looking to create an environment that's designed around the people who use it every day, reach out to our team. We'd love to discuss how people-first design can help your workplace thrive.



About the Author: ***This blog post was authored by Kayla Desper, NCARB, Architectural Graduate, Design Collaborative.***

Design Collaborative: Design Collaborative is an award-winning multi-disciplinary design firm founded in 1992, with the belief that through our work, we can improve people's worlds. With nationally recognized expertise and a passion for improving worlds, DC has grown to become consistently ranked amongst the top 100 firms in the country by staying focused on designing people-first places. At DC, we provide boutique firm experience with big firm expertise and resources. Our team includes architects, engineers, interior designers, cost estimators, graphic designers, and support staff. We are a one-stop solution, providing real-time collaboration and problem-solving. Follow Design Collaborative on Facebook, Instagram, and LinkedIn.

(Courtesy: Building Design + Construction)

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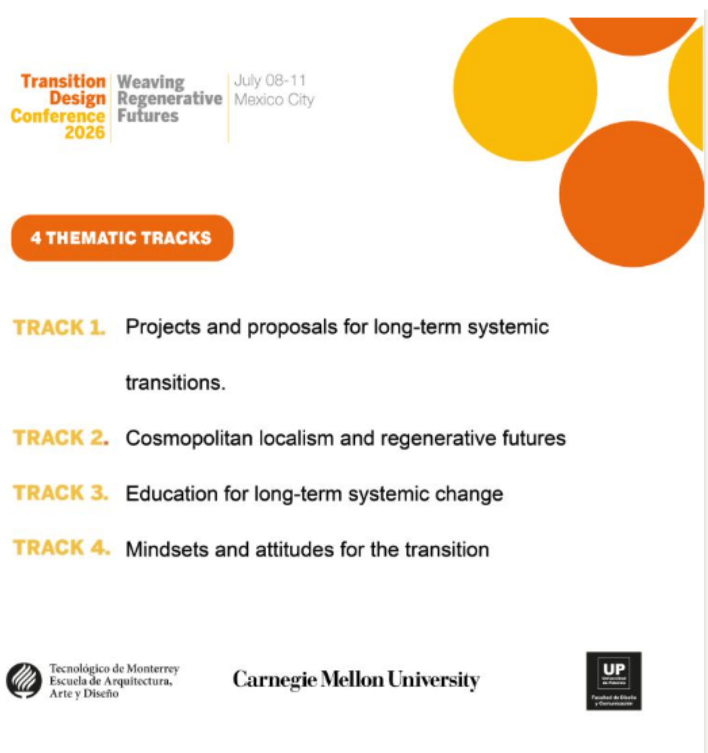

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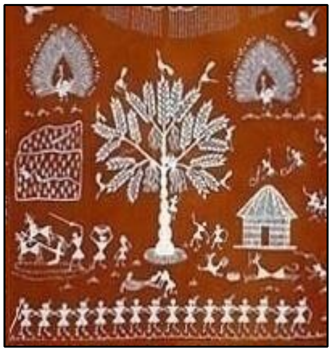

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