Architecture &
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Shared Learning Event

Sensory inclusive learning environments

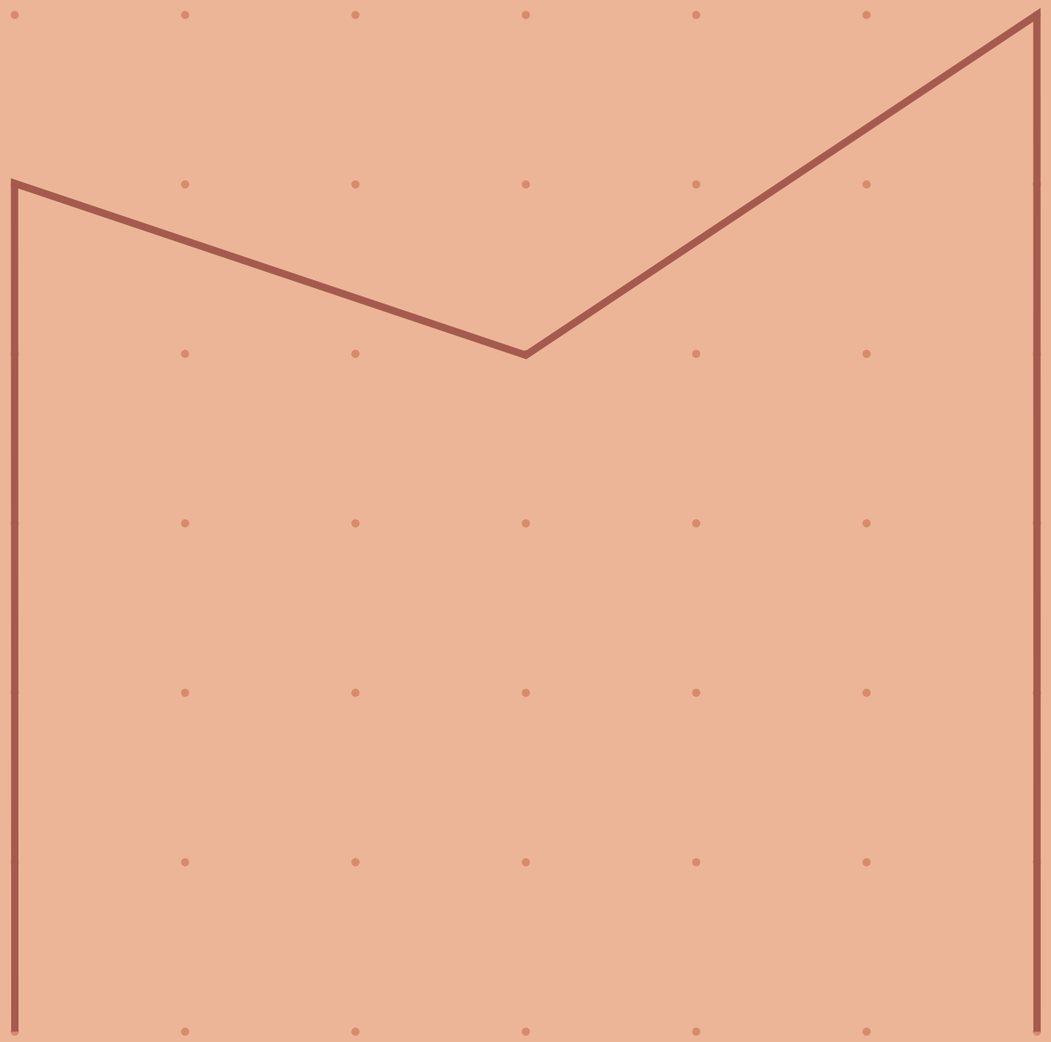


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Introduction

Stephen Long
Scottish Futures Trust



Creating learning environments that support every learner is an increasingly important priority across Scottish education. As Head of the Learning Estate Team at Scottish Futures Trust, Stephen Long works with the Scottish Government, local authorities, Architecture and Design Scotland, and the wider design sector through the Learning Estate Investment Programme (LEIP) to help shape the future of educational environments. This work has highlighted the significant role that buildings and spaces play in supporting inclusion, wellbeing and educational outcomes.

The origins of the work discussed in this session can be traced back to the Scottish Parliament's Cross-Party Group inquiry into Additional Support for Learning. The inquiry examined how additional support is provided within schools and the impact of the physical environment on learners and staff. It recognised that a substantial proportion of the school population requires some form of additional support and experience challenges that affect how they learn, teach and interact with educational environments.

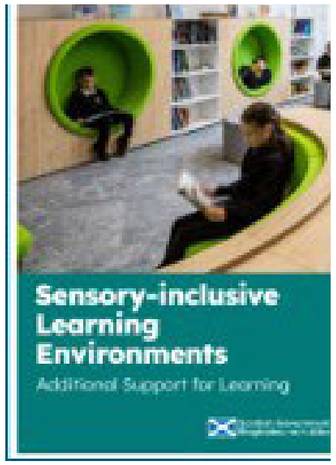
In response, discussions explored how better design guidance could support more inclusive schools. A key influence was Jean Hewitt and the principles of PAS 6463, Design for the Mind, which provided a valuable insight into neuro-inclusive design and sensory awareness and opened new ways of thinking about the relationship between people and the spaces they occupy. This collaboration ultimately led to the development of the Scottish Government publication Sensory Inclusive Learning Environments, tailored specifically for learning settings.

At its core, the guidance asks: What does it mean to create an environment that supports sensory inclusion? For many individuals, environmental factors including noise, lighting and temperature can have a profound effect on wellbeing, concentration and participation. In educational settings, they can create significant barriers to learning, teaching and social interaction. By applying the principles of universal and inclusive design and by considering the needs of those who are most sensitive to environmental conditions, we can create spaces that are more comfortable, accessible and effective for everyone – not just those with identified additional support needs.

Importantly, learning environments extend beyond the classroom. As educational approaches increasingly embrace outdoor learning and wider campus experiences, principles of sensory inclusion must be applied across both internal and external spaces to remove barriers, promote wellbeing and create places where all learners and educators are able to thrive.

Guidance for creating sensory inclusive environments

Jean Hewitt
Inclusive Environments Technical Lead at
Buro Happold



Key guidance documents

Jean opened her presentation outlining the purpose of three key guidance documents that have shaped thinking around sensory-inclusive design in educational environments. The first, PAS 6463, is a standard developed to support the design of buildings that are accessible and inclusive for neurodivergent people. Although applicable to all mainstream building types, it is not education specific. Developed with a steering group of experts bringing both professional and lived experience, the initial draft standard underwent public consultation that generated more than 4,000 comments. As the first standard of its kind internationally, PAS 6463, published in 2022, represents a significant consensus on best practice and aligns with other British Standards covering accessibility and inclusion.

Neurodiversity – Design and management guide for Higher Education environments was developed by the Association of University Directors of Estates (AUDE) for higher education settings. It provides a less technical, education-focused insight, while signposting AUDE members to the more detailed technical content within PAS 6463. Its purpose was to make the concepts more accessible and relevant to the education sector, bridging standards with practical application and examples.

These publications were a catalyst to the development of the Scottish Government guide Sensory Inclusive Learning Environments, which was the principal focus of the presentation. Unlike PAS6463 and the AUDE guidance, this publication broadens the discussion beyond neurodiversity alone by incorporating guidance relating to hearing loss and sight loss. Designed as a practical, non-technical resource, it is intended for a wide audience, including designers, educators, school leaders, governors, estates teams, sports staff, and others supporting the education and wellbeing of children and young people. Importantly, the guide applies equally to new and existing learning environments, recognising that meaningful improvements can often be achieved through simple, low-cost changes.

Sensory-inclusive Learning Environments guide

A central theme of the guide is that the physical environment profoundly affects learning, concentration, navigation, and participation. Sensory dysregulation is often influenced by environmental conditions such as noise, lighting, visual complexity, temperature, smells, and spatial layout. By responding to these factors, educational settings can become significantly more supportive for all users.

In addition to taking a holistic approach by integrating all sensory considerations, the guidance also considers indoor and outdoor environments together for each element, reflecting the reality that learning increasingly takes place beyond traditional classrooms.



Neilston Learning Campus, the Madras Family Centre.

Jean introduced what she described as the “Three Cs” of sensory-inclusive design: Clarity, Choice and Calm. These principles provide a simple but powerful framework for decision-making.

- **Clarity** refers to creating environments that are easy to understand, use and navigate, reducing confusion and anxiety.
- **Choice** acknowledges that individuals experience environments differently and benefit from having options and control over their surroundings.
- **Calm** focuses on creating spaces that minimise unnecessary sensory stress and provide opportunities for regulation and recovery when environments become overwhelming.

Together, these principles help return a sense of control to users, supporting wellbeing and learning. Jean provided a short overview of each section of the guide:

Space and movement

Designing environments that feel comfortable and manageable includes creating appropriately sized spaces, providing clear sightlines, incorporating quiet recesses away from busy circulation routes, and avoiding overcrowding. Features such as vision panels in doors allow users to see into spaces before entering, reducing uncertainty and anxiety. Small details, such as soft-close doors to reduce sudden noise, or flexible seating options that permit movement, can make a significant difference to user comfort.

Navigation and wayfinding

Clear signage, logical layouts, and sensory mapping can support independent movement around a building. Sensory mapping identifies and communicates areas that may present challenges due to noise, crowding, lighting, or other environmental factors, enabling users to make informed choices about their routes and destinations.

Temperature and air quality

Managing ventilation must be balanced carefully against potential increases in noise levels. Consideration is also given to odours, such as volatile organic compounds (VOCs). Addressing these factors can help reduce sensory discomfort and improve learning environments.

Acoustics, sound and hearing

Identified as one of the most critical aspects of sensory inclusion, excessive background noise, reverberation, and echo can create barriers to communication and concentration. The guidance encourages reducing ambient noise wherever possible and providing low-stimulation retreat spaces. Everyday fixtures, such as hand dryers, can also produce significant noise and therefore require consideration.

Light

Inclusive lighting design involves managing both artificial and natural light to minimise glare, flicker and excessive brightness. The guidance highlights the importance of selecting appropriate lighting systems, ensuring compatibility between fittings and drivers, and controlling daylight through blinds or other shading devices.

Visual and finishes

Colour, pattern and visual complexity influence sensory experience. Muted colour palettes, reduced visual clutter, and low-contrast patterns can help create calmer spaces while excessive visual stimulation may be distracting or distressing for some individuals. Simple measures, such as keeping teaching walls and presentation spaces clear of unnecessary clutter, can improve focus and reduce cognitive load.

Furniture, fixtures and equipment

Careful consideration of comfort, flexibility, acoustics and tactile qualities. Lightweight, reconfigurable furniture allows learning spaces to adapt to different activities and learning needs. Materials choice also influences acoustic and physical comfort.

Quiet and Sensory Spaces

Quiet spaces provide calm, low-stimulation environments where users can regulate and recover from sensory overload. Sensory rooms, by contrast, are often stimulating spaces featuring colour, light, sound, and interactive experiences. While both can play valuable roles within educational settings, they should not be regarded as interchangeable.

The publication concludes with signposting to additional resources and networks relating to neurodiversity, hearing loss and sight loss. The guidance reinforces throughout the message that many adjustments which support neurodivergent learners also benefit people with visual or hearing impairments, as well as the wider school community. By adopting a sensory-inclusive approach based on clarity, choice and calm, schools and learning environments can become more welcoming, accessible and effective places for everyone.

Creating inclusive learning environments

Jennifer Freeman
Associate Architect – Inclusive Design Lead NORR

Stephenson Building, Newcastle University, NORR



Briefing approach

Jennifer's presentation focused on the practical application of sensory-inclusive design principles in educational environments, highlighting how thoughtful design can support wellbeing, inclusion and belonging for all learners. Drawing on her experience as an architect and designer, she reflected on the importance of inclusive learning environments and the need to understand diversity of need from the earliest stages of a project.

Jennifer noted the significant increase in the number of pupils identified as having additional support needs in Scottish schools, which has now risen to around 43%, and reinforces the need for environments that can support a wide range of sensory, emotional and learning requirements.

Central to her presentation was the idea that successful sensory-inclusive design begins with conversations, not buildings. It involves meaningful engagement at the briefing stage with learners, educators, support staff, families and wider stakeholders to help ensure that the resulting environment reflects the needs and experiences of those who will use it.

A key consideration in additional support needs settings is the learner's journey into the building, for example how pupils arrive on site, move towards the entrance and experience that critical first interaction with the school environment. Providing opportunities for learners to pause, regulate or access quieter spaces before entering the main school environment can establish a positive foundation for learning throughout the day.

Jennifer also discussed the link between trauma-informed practice and sensory-inclusive design. Schools often provide stability, support and safety for young people, making the physical environment an important part of a wider support network. Themes such as safety, dignity, empowerment, choice, personal wellbeing and connection to nature can all be supported through thoughtful architectural responses. Factors including scale, lighting, access to outdoor spaces, biophilic design and opportunities for personal control contribute to environments that help learners feel secure and supported.

To better understand users' needs, Jennifer and the team at NORR used the "day in the life" approach during the design of Beatlie School Campus. Immersing themselves in the daily experiences of pupils and staff revealed challenges such as the considerable amount of mobility equipment and its potential impact on congestion and anxiety within circulation spaces. This insight led to the introduction of dedicated mobility alcoves, providing safe and accessible storage areas adjacent to learning spaces while keeping circulation routes clear and improving the overall sensory experience.

The immersive process also revealed opportunities to reinforce the school's unique identity. The school community's affection for its bee mascot inspired the integration of bee-themed elements throughout the building, including social spaces, lighting and biophilic elements. These details can have a powerful impact on the students' sense of belonging, by reflecting a school's culture, interests and traditions. This approach is equally valuable in mainstream schools, for example, one school's enthusiasm for celebrating Pi Day, informed aspects of the final design solution.

> **"Inclusive briefing is the firmest foundation we can have to get a project right. It's about bringing people with us on the journey."**
>
> Jennifer Freeman
> Associate Architect – Inclusive Design Lead NORR

In practice

A major focus of the presentation was inclusive wayfinding. Navigation is one of the most important aspects of sensory-inclusive design as uncertainty and disorientation can become barriers to participation. At Woodland View, this was addressed through a three-stage approach: directional, zonal and wayfinding signage.

- **Directional signage** provides an overview of the building layout and is positioned at entrances and throughout circulation routes to provide reassurance and orientation.
- **Zonal signage** helps users understand which part of the building they are currently in, often reinforced through colour schemes, furniture selections and visual markers.
- **Wayfinding signage** confirms arrival at a particular space.

Together, these elements reduce anxiety, build confidence and support independent movement.

Jennifer also explored the importance of thresholds and transitions. Moving between spaces can be challenging for some learners, particularly when sensory conditions change. Rather than applying one solution, the focus should be on providing choice through a balance of open, enclosed and adaptable spaces. Vision panels within doors were highlighted as a simple but effective intervention, allowing users to see into a space before entering, identify familiar people and understand the layout. The concept of transition spaces extended beyond doorways. Creating moments of pause, particularly between quieter and busier areas, allows users to adjust gradually, gather information and prepare for the next stage of their journey. Access to natural light, outdoor views and opportunities to stop and orientate oneself can all support this process.

Jennifer discussed how architectural geometry can influence sensory experience, comparing movement through a building to approaching a road junction; clear sightlines increase confidence, while sharp corners and limited visibility can create uncertainty.

To address this, Jennifer suggests incorporating curved walls and chamfered corners to improve visibility and allow users to gather information about the space ahead. Examples from specialist educational settings demonstrated how curved circulation routes can improve movement for both ambulant users and those using mobility equipment. By revealing destinations gradually, they create a more intuitive flow while also offering opportunities for tactile engagement with the environment.

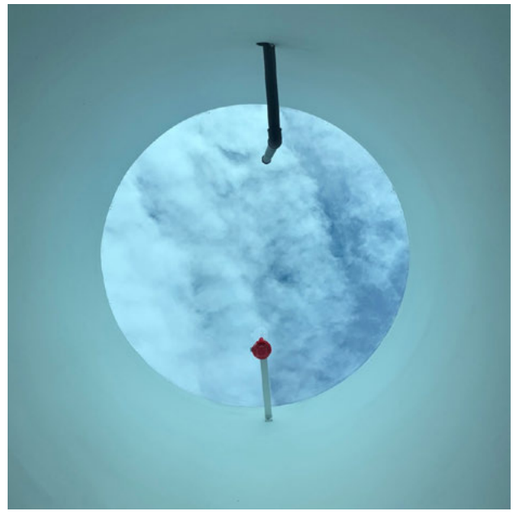
Jennifer concluded by reflecting on larger-scale applications of these principles, including higher and further education environments. Through a major refurbishment project at Newcastle University, a large central atrium was transformed into a more inclusive learning environment through a variety of interventions, including small breakout areas, quiet booths, soft seating, informal collaboration zones and enclosed study rooms. This allows users to choose environments that best support their individual preferences and activities.

The overall message was that inclusive design is not about creating specialist spaces for a minority of users but about providing clarity, choice and calm for everyone. Spaces may serve different purposes for different people; a sensory retreat in one school may be a library or breakout area in another. Through careful briefing, thoughtful design and genuine engagement with users, educational environments can become places where all learners feel safe, supported and able to achieve their full potential.











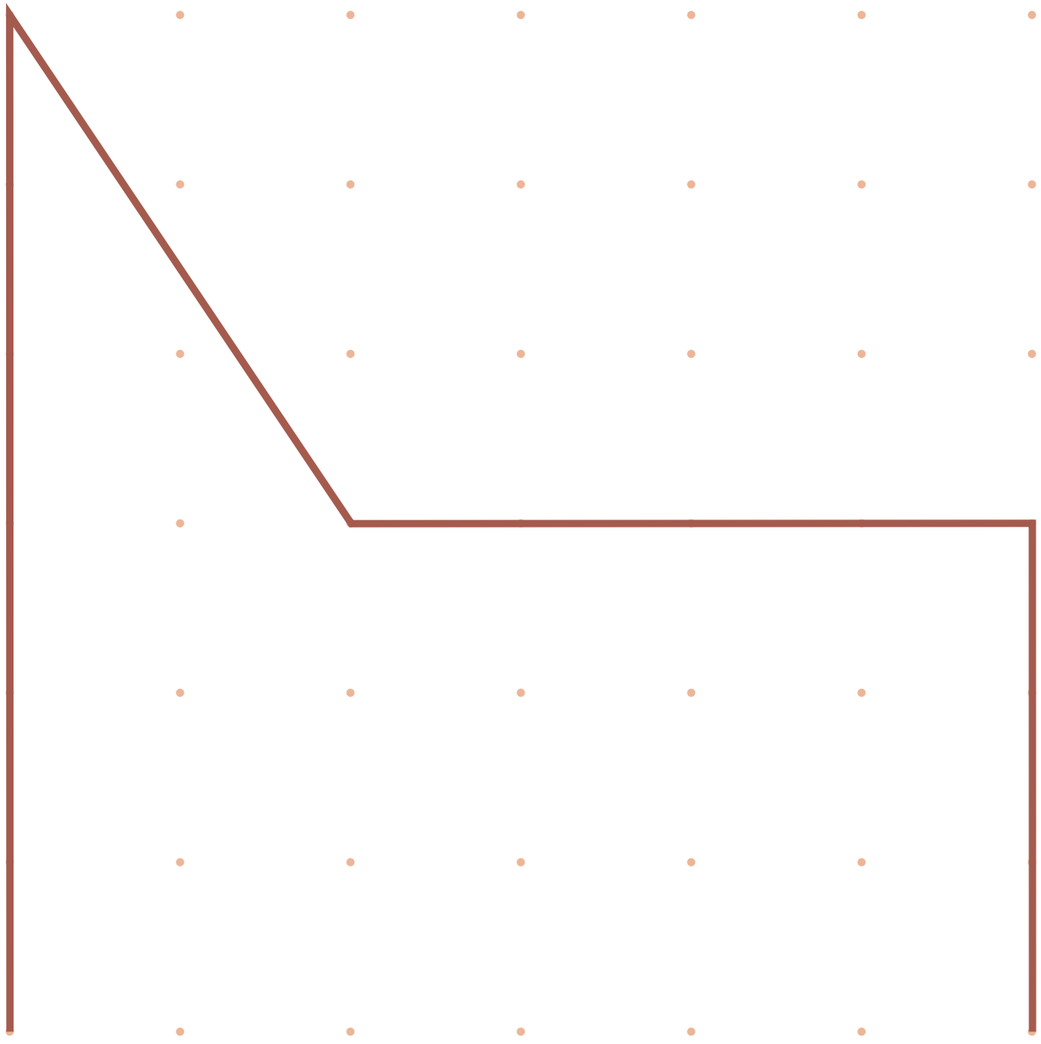
Top row, left to right: examples of directional (Woodland View), and zonal (Lockhart Campus)signage.

Middle row left: A curved wall at Beatlie Campus. Middle row right: A "moment of pause" at Lockhart Campus – a skylight allowing natural light in.

Bottom row: Glass panels at William McIlvanney ampus, allowing users to see into a space before entering.

The Belonging Quotient

Dr Shannon Babbie
Senior Lecturer of Education, University of Aberdeen
Connect on LinkedIn



The Belonging Quotient is an innovative audit and evaluation tool developed at the University of Aberdeen to assess the neuro-inclusivity and neuro-accessibility of physical environments. Unlike traditional accessibility frameworks, which often focus primarily on physical access, it examines how spaces support users' psychological, sensory and emotional experiences. Central to the concept is the belief that accessibility alone is insufficient; individuals should feel genuinely welcomed, valued and able to participate fully in the environments they occupy. The goal is to create spaces where people experience a genuine sense of belonging.

Inspiration

The project has been shaped by increasing recognition of neurodiversity across society. Around one in five people are estimated to have a diagnosed or disclosed neurodivergent condition, including autism, ADHD, dyslexia and dyspraxia. This raises questions about whether many environments continue to be designed around an assumed "neurotypical" standard that does not reflect the wide range of sensory and cognitive experiences found in the population. Shannon argued that designing for the broadest possible range of needs ultimately benefits everyone, much as universal design principles have done in other areas of accessibility.

Drawing parallels with the Americans with Disabilities Act and the "curb cut effect," he explained how adaptations originally intended for disabled people often create wider benefits. Features such as dropped kerbs were designed for wheelchair users but also assist parents with prams, cyclists and delivery workers. Similarly, environments designed to accommodate the most sensory-sensitive individuals can improve comfort, reduce stress and enhance usability for all users, regardless of whether they identify as neurodivergent.

The relevance of this approach is particularly evident in education, where more than a quarter of university students disclose a neurodivergent condition, and autistic students experience significantly higher rates of withdrawal from higher education. While academic challenges may play a role, environmental factors such as sensory overload, poor navigation, unsuitable study spaces and feelings of exclusion are increasingly recognised as major contributors to withdrawal. The Belonging Quotient was developed partly in response to these challenges, helping institutions create environments where students can thrive.

From research roots to commercial reality

The project has since expanded beyond education through Innovate UK's iCURE Discover programme, which explored whether similar challenges existed across other sectors. Discussions revealed strong interest in tools to assess and improve neuro-inclusivity. As a result, a spin-out company, OMNI Cognitive Labs is expected to launch in 2027, with plans to support organisations across education, healthcare, retail, local government and the third sector. This broader application is particularly relevant to workplaces, where only 30% of autistic adults are currently employed, leaving many unemployed or underemployed despite their skills and potential. Shannon described this as a "leaky bucket," where organisations struggle to retain talented neurodivergent employees because workplace environments create unnecessary barriers.

The BQ audit

Inspired by PAS 6463, Design for the Mind, and wider research in neuro-inclusive design, the Belonging Quotient evaluates environmental factors including sound, lighting, visual complexity, tactile experiences, smells, wayfinding, predictability, physical and psychological safety. Importantly, rather than examining individual design features in isolation, the assessment considers how these factors interact and contribute to overall cognitive load that can hinder participation, learning and performance.

A significant component of the project is the development of a digital assessment platform. Professional assessors will use a mobile data-collection tool to conduct detailed audits, while a simplified mobile application will allow individuals to evaluate their own environments through structured questions. The purpose is not

only to identify barriers but also to encourage constructive conversations between employees, managers, educators and service providers about practical improvements.

The project also includes an analytics dashboard that will provide detailed feedback to organisations. Results will be displayed through reports and heat maps, helping users identify areas where sensory challenges are concentrated. Importantly, many recommended improvements do not require major building projects or significant investment. Simple measures such as reducing clutter, improving signage, rearranging furniture, creating quiet spaces or adjusting lighting can often deliver substantial benefits at relatively low cost.

Although informed by equality legislation and inclusive design standards, the Belonging Quotient is not intended primarily as a compliance tool. While organisations may use it to demonstrate their commitment to Equality Act responsibilities, the central aim is to encourage proactive inclusion. The focus is on creating environments where people can perform at their best and feel genuinely welcomed.

Accreditation

To support long-term progress, the project incorporates a proposed accreditation framework. Organisations would progress through different levels of achievement, moving from awareness and commitment towards leadership in neuro-inclusive practice. The framework is designed to encourage continuous improvement.

The economic and social stakes

The presentation also highlighted wider social and economic benefits. Inclusive environments affect educational outcomes, workforce participation and consumer behaviour. Research on the "Purple Pound" demonstrates the significant spending power of disabled people and their families, meaning organisations that create welcoming and accessible environments are more likely to attract and retain customers. Examples from organisations that have embraced neuro-inclusive design have also shown improvements in engagement, productivity and overall organisational performance.

The presentation concluded with an overview of pilot projects taking place in schools, universities, retail centres, laboratories, offices, third-sector organisations and healthcare environments. Future applications may even extend to homes and communities, enabling people to assess everyday environments through a neuro-inclusive lens.

Overall, the Belonging Quotient represents a shift from traditional accessibility towards a more holistic understanding of inclusion, aiming to create environments where people not only gain access but genuinely feel that they belong.

> **"Near 40% of autistic students drop out early. And that's not just due to curriculum That's due to feeling the barrier of the environment."**
>
> Dr Shannon Babbie
> Senior Lecturer of Education at University of Aberdeen

The 4-Tier accreditation framework

Bronze

Neuro-Aware
Policy foundations established. Leadership and staff understand neurodiversity.
Initial audit baseline complete.

Silver

Neuro-Committed
Active remediation underway. Physical and sensory improvements implemented based on audit findings.

Gold

Neuro-Leader
Full integration achieved.
Neuroinclusion is embedded in design, HR, and estate strategy.
Staff competency demonstrated.

Platinum

Neuro-Excellence
Sector advocacy.
Organisation is a beacon of best practice, influencing peers and contributing to the global standard.

Credits and Acknowledgements

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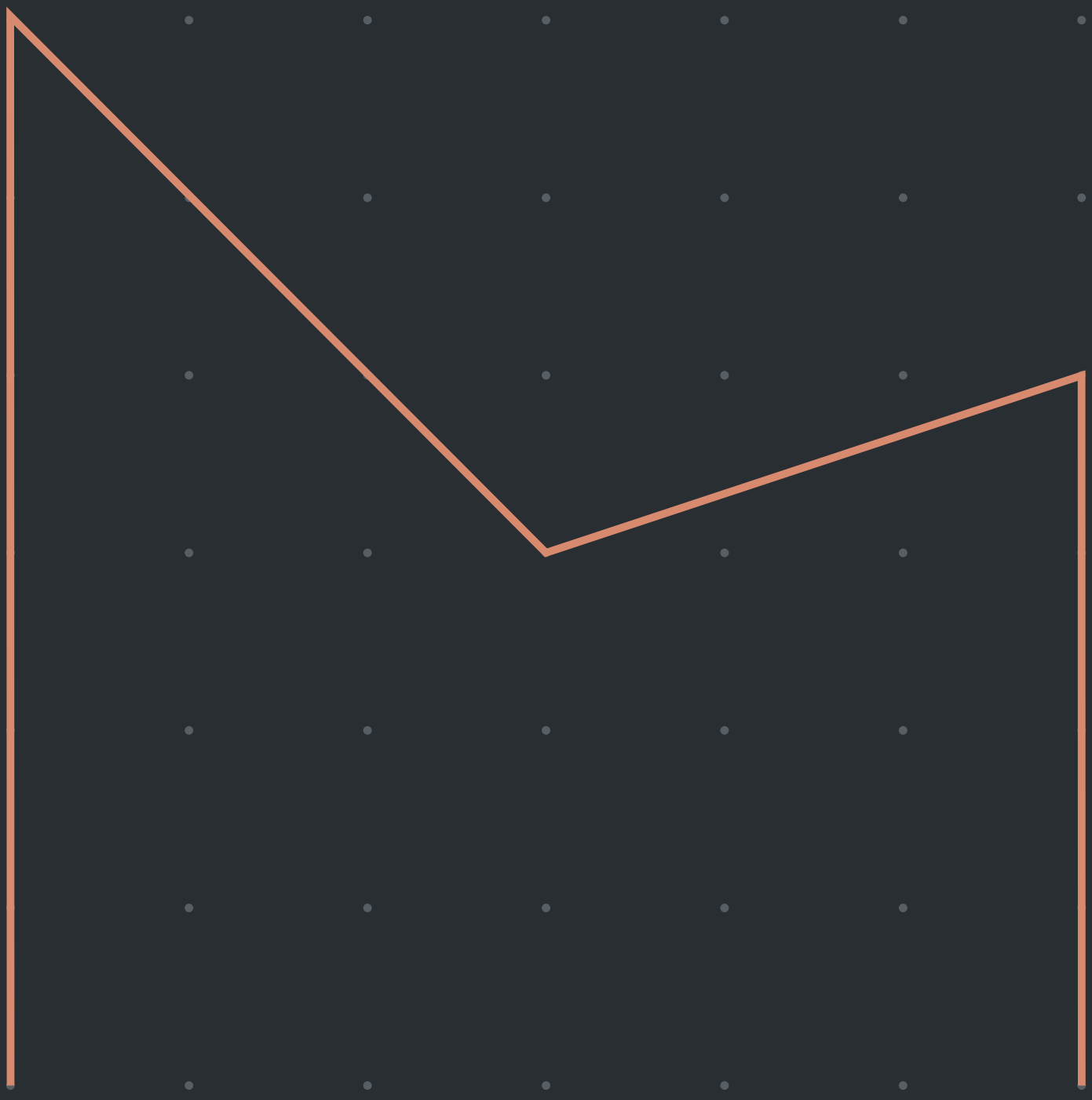
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Page 11 (left to right, top to bottom), McLaughlin & Harvey – Woodland view, NORR – Lockhart Campus, NORR / Keith hunter – Beatlie Campus, NORR – Lockhart Campus, NORR / Keith hunter – William McIlvanney Campus

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