



**Neurodiversity:
An expert opinion
on a new paradigm
in science and
education.**

Neurodiversity A New Paradigm

Introduction

Neurodiversity is a concept that postulates the evolutionary and universal design of diversity in human neuro-cognitive capabilities and potential. This diversity encompasses a wide spectrum of traits that find expression in dyslexia, autism, ADHD, dysgraphia, dyscalculia and dyspraxia (developmental coordination disorder). Research evidence suggests that over 20% of humankind meet the threshold for a classification of these differences that we define in our medical taxonomy as 'neurodevelopmental disorders', and in our education system as 'learning difficulties'.

Neurodiversity is a new understanding of human neurocognitive capabilities that embraces differences; it is a social movement, aligned to a social theory of disability by its originator - Judy Singer,⁽²²⁾ in Australia in the 1990's, stating her opposition to the socially constructed oppression and socio-economic exclusion of people with autism. Research in neuroscience has proven that the brains of those with dyslexia, autism, ADHD, dyscalculia, and dyspraxia are structurally and functionally different. Why do approximately 1.4 billion human beings of our world's 7.9 billion citizens have these different minds? A Neurodiverse paradigm argues that the prevalence of these 'different minds' must have an evolutionary purpose and representative of the evolutionary universal design.^(2, 10, 11, 14, 22, 23)

The human brain is a complex organism that must be understood in the context of the entire human ecosystem of the body, together with its biopsychosocial experiencing of its environment and its internal responses to that environment. Our sense of self or consciousness is however a product of 'mind' that comprises of both our brain and entire nervous system that orchestrates our relationship with the world that we perceive ourselves to inhabit.^(6, 7) This experiencing is unique to every individual. We may share common human characteristics of how our minds interact with our world, but our unique neurology that is the product of both our genetic inheritance and our unique lived experience of our world. This inevitably results in differences in *how* we process,

understand and respond to life events and act upon our environment and the people who inhabit it.^(6, 7, 13) This is exemplified in those with dyslexia, autism, ADHD, dyspraxia, dyscalculia, dysphonia, synaesthesia, Tourette's syndrome and indeed other neurobiological differences creating an 'experiential diversity' that influence cognitive and behavioural responses to the world we live in.

That some people are regarded as disabled, competent, or gifted is determined by the context we find ourselves in, as human beings display an incomprehensible array of talents, abilities and competencies, the value of which is determined by the situational values placed on such capabilities.⁽⁴⁾ Thus, our brain and the human organism it occupies, orchestrates how we adapt and evolve to our world and also how we adapt our world to meet our needs. This adaptation is both for the individual and the social groups to which we belong and society as whole.^(7, 10)

The neurodiversity movement is challenging our traditional concepts of intelligence, ability and potential that have classified those 1.4 billion humans with either dyslexia, autism, ADHD, dysgraphia, and dyscalculia (or a combination of these differences) as 'disordered' or somehow 'less than' the 80% that are classified as 'neurotypical'?^(9, 20) Neurodiversity is concerned with the dignity of the individual human being and their right to self-determination, respect and inclusion, in a way that challenges the 20th century conventional perspectives about what is *normal* or *necessary* to be included and valued.⁽⁹⁾



Context is everything – almost.

To understand the questions posed by this neurodiverse paradigm, we must understand the contexts, in which we define and identify one another and ourselves. This question must be understood in the context of the genetic imperative in human beings which is ‘relationship driven’. Humankind is a social species; we thrive in relationship with others.^(6, 13) Our understanding of attachment theory and the lived experience we have, tells us that human beings cannot thrive in isolation. From birth, we must attach to primary care givers – our parents, because as infants we depend on them completely to meet our hierarchy of needs, beginning with the reassuring protection expressed in intimacy of touch and the provision of protection, food, shelter, and warmth essential for our survival. The process of socialisation requires us to develop certain competencies as we progress through a childhood, adolescence and into full adult maturity.^(6, 13)

The genetic imperative to live in relationship with others requires us to express our needs and self-actualise through learning about and understanding the world we inhabit and those human beings who orbit our world. We learn behavioural expressions that communicate our needs, from a very instinctive level as infants, crying when we experience hunger or discomfort and the instinctive need to be in close proximity to our primary care givers.^(6, 13) This behavioural expression of our developing self-actualisation requires we learn to behave in ways that ensure our instinctive sense of safety in ‘belonging’.⁽¹⁾ This ‘belonging’ is a lifespan process, beginning with learning behaviours that enable us to be known and understood by significant others, to belong



to a family, extended family, and friends with whom we play and learn. Our earliest memories of this are usually our school community and extend across our lives with every social group in which we have an interest or necessity to belong. We gravitate toward social groups, be that the play group, football team, book club, hobby or special interest group, and also our sense of belonging to a society or nation state. Such belonging tells us something about our identity, who we are, and our existence in relation to others. Such belonging requires that we place equal value on the needs of others in that social group and adapt our behavioural expression of our own needs and our unique contribution to the purpose of those social groups. Our belonging is therefore also determined by the values, skills and competencies we have learned that are of value to the cohesion of that social group, including the social group that is the school or workplace.⁽¹⁰⁾

Human beings, seek not only a sense of belonging but also a sense of validation from the communities of which we are a part. Our sense of worth and self-esteem is also a reflection of the values and endeavours of the social group, and our instinctive need to belong, feel protected and experience human intimacy through connection and relationship. This sense of belonging and common purpose needs also to be understood in the context of our place of work, because our *economic wellbeing* impacts on our belonging to a range of social groups and the quality of many of our life chances. Our skills and competencies when valued by others, consolidate our position in that context. Our role in the workplace reflects the values, objectives and activities of the workplace that invariably include profitability for financial sustainability. We add value by contributing to the sustainability or profitability of the workplace group, or as active citizens if the workplace is a civic 'not for profit' agency, concerned with providing a public service, such as in our schools, health services, social care services and administration of the state.

Neurodiversity is a concept whose time has come. Diversity movements are agents of social change. Equality and inclusion of race, sexual orientation, class and culture are the forerunners of seismic shifts in our understanding of society and the individual, that inform our understanding of the world we share.⁽²¹⁾ Neurodiversity is reframing our understanding of intelligence, ability and potential and the value we place on the capabilities that are integral to social cohesion and social justice, of which commerce is increasingly a key influential factor.

Neurodiversity is a cause for celebration because it liberates, enlightens and enriches our understanding of humankind, and embraces these differences as an expression of the evolutionary and universal design for humankind.

Why advocate for a neurodiverse paradigm? The moral and economic imperative.

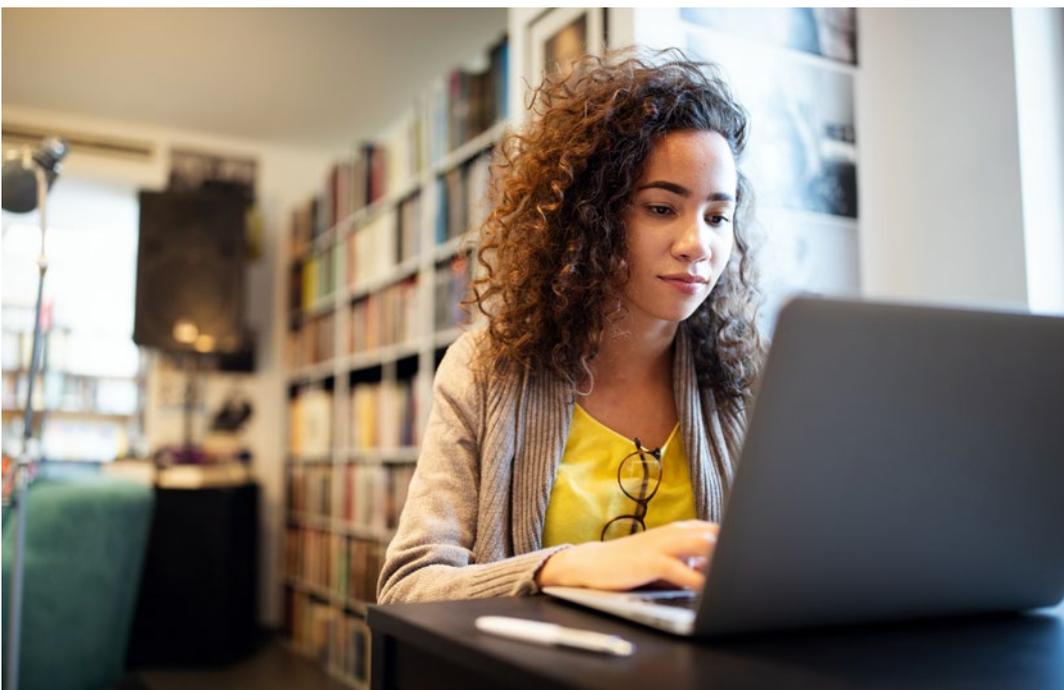
Neurodiversity celebrates, respects and *enables* the realisation of our cognitive potential and shines a *positive strength-based* light on neurological differences such as autism, dyspraxia, dyscalculia, ADHD, dysgraphia, sensory processing differences and dyslexia. A neurodiverse paradigm postulates that we should not view the 1 in 5 human beings with these different minds as ‘disordered’ or errors of genetics, or of less value than others. This **spectrum of traits** exists in all human beings, but present in a different or more pronounced form in those we label with dyslexia, autism, ADHD, etc. This postulation extends beyond the moral imperative of equality, diversity and inclusion. This hypothesis also has an economic imperative that have given some industries such as technology a competitive edge. The neurodiversity agenda proposes that it is society’s limiting and disabling perception of this spectrum of traits, these different and sometimes *special interest expressions of intelligence*, ability and potential, that in fact perpetuate exclusion, disability, educational underachievement and reduced socio-economic prosperity.^(4, 14, 21, 22)

The background of the text box is an abstract digital graphic. It features a dark grid pattern overlaid with vibrant, multi-colored light trails in shades of blue, green, yellow, and red, creating a sense of motion and depth.

The spectrum of traits that we know as neurodevelopmental conditions involve multiple gene variances that frequently overlap and therefore render linear concepts of mild, moderate or severe as simplistic when measured in different life contexts.

Co-occurrence between dyslexia, ADHD, Autism, dyspraxia, dyscalculia is the rule rather than the exception.

The economic imperative is evidenced in the fact that the major growth industries of the 21st century, technology, computing, bioscience, bioengineering, robotics, automated manufacturing and web-based media, have been actively recruiting a neurodiverse workforce for over three decades.⁽⁴⁾ Global brands such as Microsoft, Apple, Google, Sony, Twist Bioscience, Rolls Royce, Tesla, to name but a few, argue that the reason for their success is the competitive edge and profitability that derives from innovation and 'thinking differently'.^(4, 23) These industries not only respond to the changing needs of customers and society at large, they also establish trends that influence our needs by influencing our culture as well as commerce. The best example of this is that most people now download music or stream it onto mobile devices rather than buy physical media such as compact discs or vinyl records. Technology driven organisations communicate differently and in ever more innovative and efficient ways, consequently, their windows of communication can utilise and create data that enables access to new markets, connecting with different minds, different perceptions, different needs, tastes, interests, communities, and therefore reach new customers. Sophisticated and accelerated communication also makes innovation, invention and creative problem solving and enterprise easier. Technology therefore is integral to the functioning of any successful organisation.⁽⁴⁾



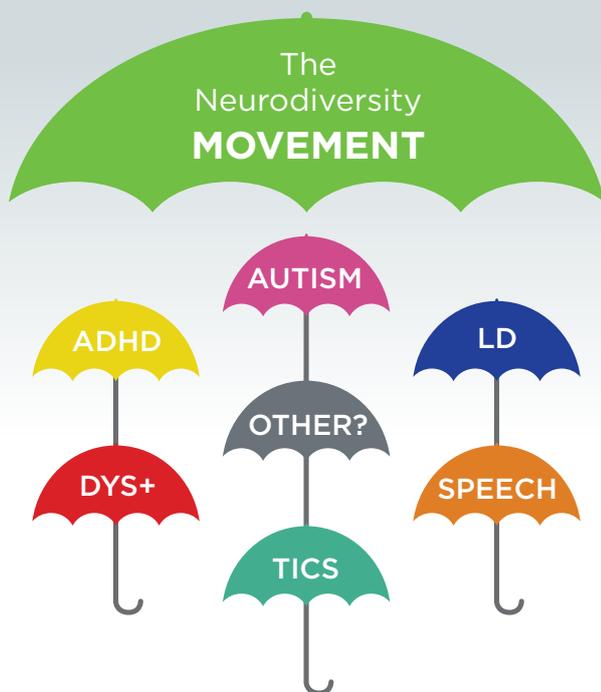
Such industries have challenged the popular convention of decision makers always being of 'like mind', ostensibly because if all decision makers are of 'like mind', then all you get is more of the same thinking and approach that can sometimes be a barrier to the required innovation, change management and even the visionary solutions that drive enterprise. That major growth industries have actively recruited a workforce comprising of employees with dyslexia, autism, ADHD, dyspraxia, dyscalculia and dysgraphia, contrasts with our educational paradigm where 7 out of every 10 children we exclude from our schools in the UK, are children with these 'different minds' that we describe as 'learning difficulties'.⁽²⁷⁾ This begs the question, what does industry see in these individuals that our education system does not see or value? Some would argue that what industry, enterprise and scientific endeavour have changed is the 'context' because the technology driven world we live in now, values these 'different minds' in a way that traditional industries have not. This contrasts with our educational paradigm that has remained relatively fixed 19th century paradigm, where the dyslexic mind, the autistic mind, the dyscalculic mind, and the ADHD mind, were defined as learning disability that connotes with low ability. This raises yet another question; 'Is our concept of intelligence, ability, competencies, - and how we measure them, changing?' A Neurodiverse paradigm implies that it is.

Is this emerging neurodiverse paradigm an adaptive and evolutionary response to the requirements of the 21st century context? If this is the case, what are the consequences for traditional paradigms in medicine and education?



Lawrence K Fung has written eloquently in defining neurodiversity as comprising of four principal components comprising of Gardner’s theory of multiple intelligences (1983), positive psychology espoused by Seligman and Csikszentmihalyi (2000), positive psychiatry promoted by Jeste et al (2015) and Chikering’s seven vectors of development (1993). Collectively, these four components provide a new framework to develop strength-based models of education and employment as well as changing the pathologising medical model of neurotypes.⁽¹⁰⁾

The growing body of literature on neurodiversity calls for an increasingly multidisciplinary approach of coproduction that encompasses perspectives, contributions and design that includes different minds and different ways of thinking. Such an approach offers exciting possibilities for industry and public services, in a rapidly changing technology driven culture.



21st Century learning requires critical thinking, collaboration, creativity, innovation, solution focused approaches to a rapidly changing world, culture and economy.

These are the skills - and other "different abilities" we find in abundance in the neurodiverse population.



A Paradigm shift in Education?

Neurodiversity when applied to children has been framed traditionally from a deficit-based classification of ‘special educational needs’, or ‘learning difficulties’ which in England account for 12.2% of children, however this 12.2% does not include children who have not been identified as neurodiverse by age 16.⁽²⁹⁾ In many education settings the cultural prejudices and misconceptions continue and perpetuate the isolation, stigma and unrealised potential experienced by an estimated 20% of children who have dyslexia, ADHD, autism, dyscalculia, dysgraphia and sensory integration differences. These labels have become a form of shorthand premised on what school children ‘cannot do’. The deficit-based model is premised on key competencies considered to be ‘necessary’ by certain stages and ages in child development. The very fact the human brain does not reach maturity until early twenties implies that our neurocognitive potential cannot be fully measured until such time as our brains reach maturity – when most people have completed their formal education.⁽⁷⁾

Research on the neuroscience of learning compels us to ask questions about *how* we educate and socialise children and the life trajectories adults impose on



them, premised on predetermined pedagogical objectives that require standardisation. For those children who do not have standardised minds that attain in standardised tests based on an arbitrary measure of competence, interventions to remedy perceived deficits can be offered. Strategies to scaffold learning and the use of assistive technology will not eradicate or cure dyslexia or other neurodevelopmental differences, rather they enable the neurodiverse child to more access an education and perform better in school examinations. Such strategies will be designed to ensure the child's mind meets the *requirement of measurement* applied to every single child within the parameters of a predetermined framework that classifies what has been learned as either a grade A, B or C. The theoretical underpinnings of neurodiversity require us to focus on a strength-based pedagogy that nurtures capabilities, talents and a recognition of individual interests that feed our *reward activated* neurology. The growing volume of literature that is now appearing on 'neurodiversity in education' is evidence of our changing perceptions and changing pedagogy in education and a revision of what we consider to be outstanding teaching.⁽¹⁶⁾

The value of labels and identifiers.

Labels in themselves are useful, they help us to simplify the world around us. The labels associated with neurodevelopmental conditions have however become stigmatising, stereotyping, and discriminatory in a way that can result in prejudice and exclusion across the lifespan, and especially socio-economic life chance trajectories. Unfortunately, the term 'behavioural disorder' often used to describe ADHD and autism is misleading and incorrect. The term 'behavioural disorder' implies a moral component that behaviour is always chosen, with a congruent awareness, understanding of its cause, motive and consequences. ADHD and Autism are defined in medical taxonomy as neurodevelopmental disorders - not behavioural disorders. All behaviour is a form of communication, and in children with limited self-awareness, limited vocabulary and with brains that are not fully developed until adulthood, our highly subjective understanding of behaviour we observe in others, does not always accurately inform us about what the child is communicating or their intention. Behavioural expression is not an intrinsic part of autism or ADHD, but because there is a mismatch between their ways of thinking and behaving in the context of the classroom environments that are structured in accordance with neurotypical perspectives.⁽²⁴⁾

In many schools the teacher workforce generally views this cohort of 20% of children with learning differences as the primary concern the specialist designated teacher with responsibility for teaching neurodiverse children. The cultural perception that these children are somehow 'less than' may account for the research evidence that suggests these children are more likely to be bullied by their peers as well as excluded from school.⁽²⁸⁾ Some schools select children based on a required entry test usually aged 11 years when most children transition to high schools. For a child with a neurodevelopmental delay and a learning difference such as dyslexia, they will likely underachieve in the entry test - especially if their learning difference has never been identified. Some schools may choose not to enrol neurodiverse children, premised on the misconception that they are low ability, - based on our current measurements of academic competencies in our educational paradigm. A Technology driven economy, however, is now changing the value assigned to certain competencies or different types of intelligence or abilities, because technology-based industries place a greater value on cognitive specialisms that are found in abundance in those with dyslexia, autism and ADHD.⁽⁴⁾

The traditional mindset in many schools is that there is a shared responsibility of all school staff to educate and socialise children and adapt their teaching and make accommodations to meet the needs of every child. Many schools are moving to multidisciplinary teams offering a more inclusive, holistic model of meeting children's needs that involves school counsellors, welfare staff and specialist professionals, rather than the child having to fit around the needs and of the school; square pegs don't fit in round holes and data sets will never reflect the relationships that underpin success indicators.

There is a collective responsibility to adapt the learning environment to meet the needs of every child. We must make reasonable adjustments and accommodations to enable and optimise wellbeing, neuroplasticity and learning, enabling adaptability, psychological resilience and transferable skills so the student is able to respond positively to the requirements of their environment and the opportunities available to them. This neuroplasticity is at its optimum in two stages of maturation, in infancy and in adolescence.^(6, 7, 11, 12) The transition to adulthood demonstrates how neurogenesis enhances our capacity for self-determination and the cognitive ability to then adapt both our environment as well as our neurocognitive capabilities.

Teachers are not all routinely trained to identify a child with neurodevelopmental conditions. Some differences can require skilled expert assessment and support such as autism or ADHD. It is easier to justify our abdication of responsibility if we

assign the responsibility solely onto another professional such as a medical doctor who by labelling the child as disordered or disabled because then the fault for underachievement is with the child, not the professionals. Working in professional silos is the antithesis of a holistic inclusive education.

Dyslexia is the most prevalent neurodevelopmental condition – or learning difference that affects an estimated 1 in 10 children.⁽¹⁴⁾ Some research suggests that up to 80% of dyslexic children are never identified in school, and consequently not supported with specific teaching and learning strategies and use of assistive technology that enables them to optimise their learning differences and achieve.⁽¹⁴⁾ If the assertion by Kate Griggs, founder of the NGO ‘This is Dyslexia’, that 80% of young people with dyslexia leave education never having been identified as having dyslexia then one must suppose that their written literacy skills can be mistakenly interpreted as inability and a failure to meet a required standard of competency in literacy. This would have a significant impact on their self-concept as a learner and a significant factor on their career and economic prospects.⁽¹⁴⁾

With conditions such as ADHD, some educators see the child’s needs as a distinctly ‘medical problem’ that can only be addressed with medication. Over reliance on a medical model does not require teachers to adapt their teaching pedagogy to meet the needs of the 1 in 20 children with ADHD.⁽¹⁵⁾



Some 'Neuro-myths' continue to permeate the culture in many schools throughout the world; "Autistic children lack empathy"; "Dyslexic children simply require coloured overlays to read", "Children with ADHD distract others and refuse to follow instructions", "ADHD doesn't exist, it is a cultural construct and simply the result of poor parenting and lack of discipline"; such enduring myths are used unwittingly to justify exclusion and abdicate responsibility. To deny a neurodiverse child the necessary tools and accommodations to access an education is no different that denying a child with a wheelchair, a ramp to access the steps at the entrance to the school. Difficulty accessing an educational psychology assessment or a medical assessment, results in many children being identified and supported so late in their educational career, with obvious consequences for the academic progress, attainment and employment prospects. This is especially true of neurodiverse young girls who are likely to be identified late.⁽²⁵⁾

We must ask ourselves the question, if Albert Einstein - who was mute until three years of age and considered to have been autistic, what would his experience of education been in schools today? Would his genius have been missed? Leonardo da Vinci, arguably one of the greatest scientists and inventors of all time, has been proven to have had ADHD and possibly dyslexia.⁽²⁶⁾ Would da Vinci have been excluded from school or underachieved because of his neurodiversity? Mozart is considered to have been autistic. Our school history curriculum is littered with these great minds, but they are rarely spoken of in terms of their neurodiversity because culturally we do not equate 'success' or 'high achievers' with students we describe as having 'learning difficulties'.

Many educationalists are now advocating for a paradigm shift in how we educate children and how we measure intelligence, ability, skills and potential. IQ however, is the traditional metric used widely to measure intelligence, but IQ measures only certain cognitive abilities. Howard Gardener's 1983 theory of multiple intelligence encompassing, kinaesthetic, existential, interpersonal and intrapersonal intelligence, together with logical mathematical, musical rhythmic, naturalistic, verbal linguistic and visual spatial intelligence, offered a new enlightening model of defining intelligence which is compatible with a neurodiverse paradigm.^(10, 11, 12.)

Some educationalists are now questioning whether annual school examinations, conducted in silent halls, requiring the recalling of facts, with limited use of assistive

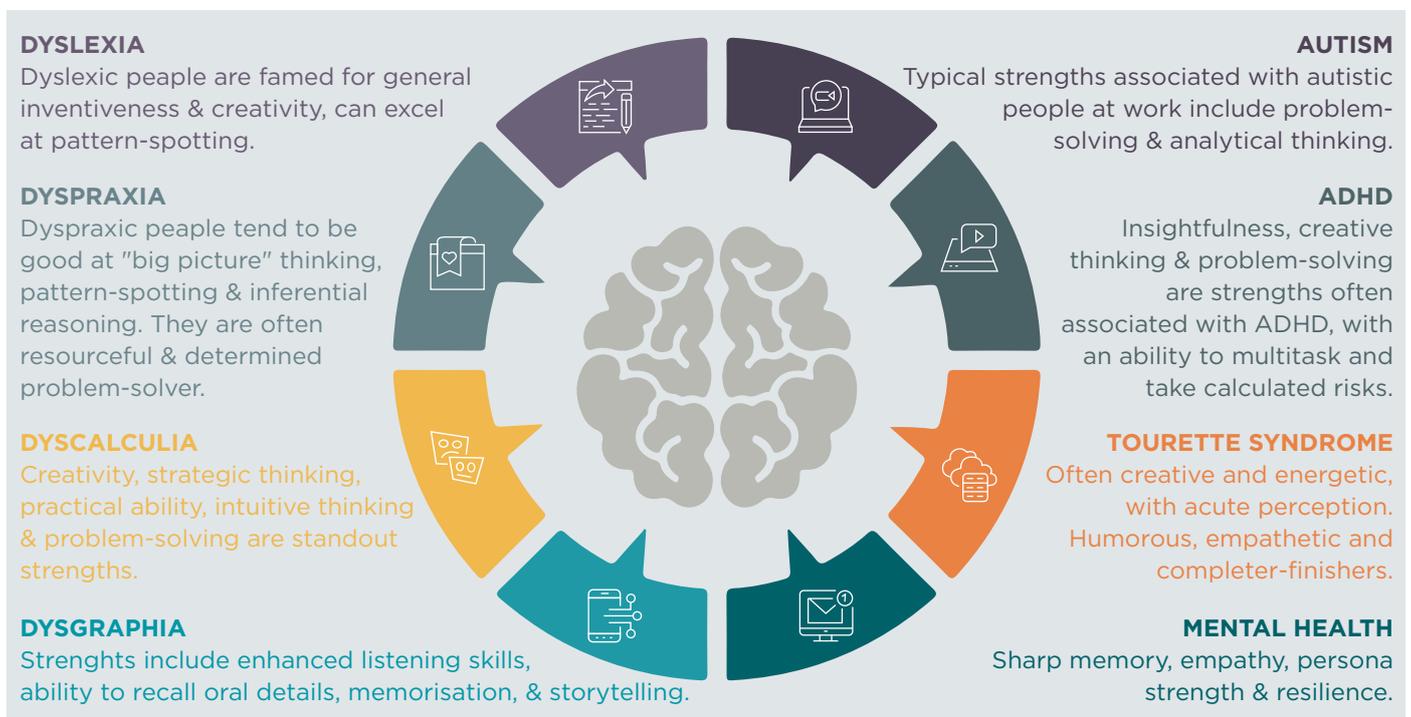
technology, are contextually relevant to 21st Century culture and workplace. Do school examinations accurately reflect the intelligence, ability, innate talent or potential? Does the way we measure children's attainment in schools, by definition, exclude the neurodiverse 20% of school children marking them as being less able? No system is perfect, but as the trend in recruitment is moving toward including cognitive profiling, rather than simply a CV, structured interview and university degree, are educational qualifications of less importance to employers than they once were?⁽²³⁾

Our education workforce is comprised of individuals many of whom have never left an educational setting, one might assume because they thrived and achieved in such a setting. Is it inevitable therefore that they perpetuate a pedagogy that views neurodivergent students as academically less able? In a rapidly changing world, what are the competencies we should be developing in young people? What competencies and knowledge are valued by employers and indeed society in the 21st century? Are the skills we teach in our schools and universities as contextually relevant and transferable as they need to be? Also, what do young human beings really need to learn to 'thrive' in the 21st century? Qualities such as resilience, communication skills, solution focussed problem solving, psychological well-being, creativity, integrity and even kindness are now frequently listed as essential characteristics required by employers. Are these qualities or characteristics inculcated into the school or university curriculum and measured? It is a modern irony that we see a younger generation that is perhaps more emotionally literate than any previous generation, but paradoxically, more troubled, evidenced by the fact that across the globe there are reports of escalation in childhood anxiety disorder? Is this stress response an indicator that our ability to adapt our educational practice to keep pace with the rapidly changing demands of our modern environment?

There is a positive emerging trend toward personalised learning that plays to the cognitive strengths of the child and providing additional teaching support in curriculum subjects for which the child may not demonstrate certain cognitive competencies. Children do not all develop at a standard rate of maturation. Our brain and nervous system are as unique as our fingerprints. We no longer force left-handed children to write with their right hand purely because it is the popular convention. *One size does not fit all.*

A neurodiverse paradigm will inevitably result in replacing our categorical measures of intelligence and ability, with a dimensional concept of intelligence and ability that recognises context as a variable measure, and places the *relationship* with the child at its centre.

The cognitive abilities of neurodiverse minorities feature a common characteristic of being Specialised Thinkers.



The paradigm shift in education is reflected in the exponential global growth of schools, colleges, universities embracing the concept of neurodiversity. A growing number of young people are themselves challenging the cultural exclusion of neurodiverse school children. In my work I am hearing a growing number of school children who are now rejecting the classification of 'special educational needs and disabilities' because it connotes for them exclusion and stigma. Some young people have flipped the narrative completely, reclassifying their dyslexia, autism, ADHD and dyscalculia as 'superpowers'. Students increasingly esteem their learning differences and are reclaiming their universal right to an inclusive education - adapted to meet their needs. This is a powerful statement about their sense of belonging in their schools, institutions that have often made them feel and believe that they do not belong, and their abilities and potential unrecognised and undervalued.



The requirement of teachers to develop and maintain relationships with hundreds of children in their school is, demanding for educators. However, teaching and learning is a social process, - a relationship; everyone remembers that one teacher who inspired them, who encouraged them to believe in their potential and strive to achieve their goals. These are the teachers who understand the genetic imperative is relationship driven. We may forget much of what we learned in school, but we do not forget those relationships with the teachers who inspired us to believe in ourselves and aspire to experience and achieve more. We owe those teachers, a great deal.

A paradigm shift in the NGO / Charity Sector.

NGO's, Charities and advocacy groups have been effective instruments of change, raising awareness of issues that through public support, are able to advocate and campaign to achieve social change. NGO's influence our culture, our public services and sometimes government legislation to ensure the democratic and human rights are protected. Such charitable activity requires revenue to operate and how such organisations raise funds requires they inform the public and governments of the needs, disadvantages and exclusion of certain communities. Inevitably, emphasis is placed on the deficits, disabilities, and dysfunction as well as the social injustice. Thus, for many who identify with such issues, they are confronted with information that can reinforce a victim narrative and their *sense* of disability and exclusion that offers little hope, self-efficacy and potentially serve to reinforce pathologised identities.⁽²⁾ A strength based neurodiverse paradigm, counters the 'victim narrative', and empowers the individual by emphasising their ability and potential, - without denying the challenges or differences or demeaning the lived experience of exclusion with ableism.

Neurodiversity is also a political issue. This paradigm is not yet three decades in existence and the language we use is important because dyslexia, ADHD, autism, dysgraphia and dyscalculia - all naturally occurring neurocognitive phenomena, say something about our identity. Are you dyslexic or a person who has dyslexia? Do you identify as disabled because of your autism or ADHD? Some people do and others do not. Some with these different minds identify as 'neurodivergent' as distinct from 'neurotypical'. When Australian sociologist Judy Singer coined the term neurodiversity in 1997, neurodiversity was a quality of populations, not individuals.⁽²²⁾ However, others now identify as 'neurodiverse' rather than neurodivergent because many share a view that if neurodiversity is the evolutionary universal design, then to be neurodivergent is a contradiction in terms if you 'diverge from the norm'. There is no right or wrong definition because identity politics are complex and language evolves. To indulge in lexical semantics misses the point; neurodiversity is a 21st century paradigm whose time has come, and the conversation will continue to evolve as will its impact on our culture, identity, and anthropology. The role of the NGO's is vital in bringing awareness and social change that benefits those disadvantaged and disabled by culture or legislation. The challenge is to advocate, educate and campaign for social change - without contributing to the disadvantage by encouraging victimhood or helplessness. The most successful NGO's are those that demonstrate best practice models that can be replicated and scaled up for the benefit of all. NGO's concerned with neurodiversity have an important role to

play several ways; stakeholder involvement in the coproduction of public services, supporting legislation to protect the marginalised, disadvantaged and vulnerable, and in enabling their service users. NGO's must consider how neurodiversity impacts on every community, race, religion, gender, age and profession. Neurodiversity is everyone's business.

A Paradigm shift in recruitment and employment?

The case for neurodiversity in business is now established; as aforementioned, the major growth businesses of the 21st century are testimony to the fact that diversity is a dynamic of the successful business.⁽⁴⁾ Neurodiversity is intersectional, spanning race, gender, faith, nationality, and age. Thinking differently is now a mantra for the commercial pioneers. Many employers are now transitioning away from traditional models of recruitment and employee performance to a more inclusive and neurodiverse approach to identifying and optimising the performance of a diverse workforce.⁽²³⁾

CV's and covering letters of application are now viewed by many as less effective than a holistic and targeted approach to human resource management. Cognitive profiling is another to identify specific but cognitive competencies



aligned with a specific job role or function within an organisation is a growing trend.⁽²³⁾ Team dynamics and the requirement to have different approaches to project management also factor in recruitment protocols.⁽⁴⁾

In the UK, government agencies including security services now actively recruit employees with autism, dyslexia, ADHD, dysgraphia and dyscalculia. Such agencies argue that a neurodiverse workforce is not simply an expression of equality, diversity and inclusion, but echoes the private sector, demonstrating a recognition of the unique contribution and necessity for any organisation to employ minds that 'think differently'. Of course, such 'different' minds have existed in all walks of life and professions and always have; we simply didn't see them; because we were enculturated into a mistaken belief that successful people and university graduates cannot possibly have 'learning difficulties'.

Retail and leisure industries are now also recognising the necessity of awareness of colleagues and customer experience and how this can be personalised to optimise profitability and promote brand values that are increasingly attracting new customers. There is now something qualitatively different in our understanding of industry and enterprise, where once angels in denim trumpeted the glories of greater productivity, heralding purchases from our cathedrals of consumerism, now values-based consumerism is driving the marketing of many brands. Climate change, LGBTQ rights, animal welfare, anti-racism, mental health and now neurodiversity are aligned with products and services that attract customers because they make a statement about issues that concern them.

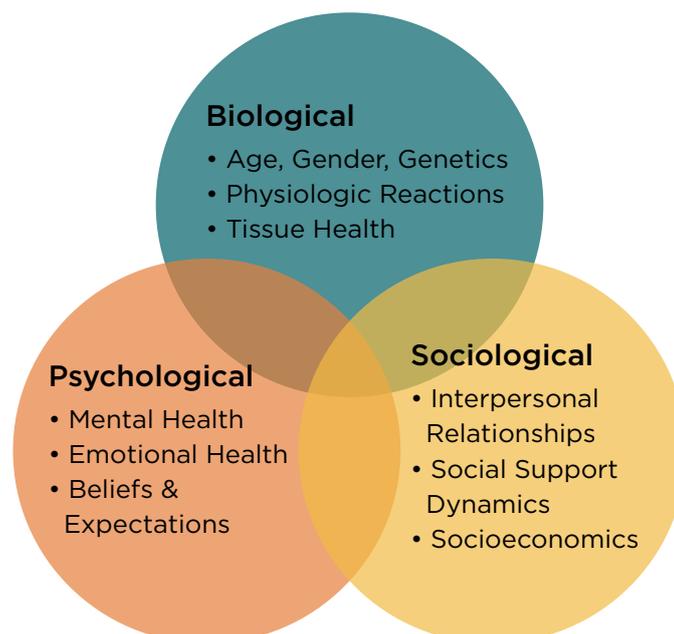
The emerging trend in sales and marketing, is that of 'experience', not simply utility or ownership and status. Lighting, temperature, noise levels, the spectrum of colours in the interior design of the retail outlet, dyslexia friendly type fonts, - all inform 'customer service needs', and sense of reward and customer satisfaction. Again, one size does not fit all; value now means more than the price tag. Leisure and retail are becoming neurodiversity friendly. Accessibility for neurodiverse shopping customers is a metaphorical wheelchair ramp. Employers in all industries would benefit from recognising the profound impact of a neurodiverse workforce in the major growth industries such as technology, robotics, bioscience, engineering and the creative industries.⁽⁴⁾ The Neurodiversity Umbrella Project sponsored by global brands such as Equazen that celebrates the unique contribution of these 'different minds', bringing colourful canopies of umbrellas above our city centre high streets and in schools and offices, is an example of how businesses reflect a more values driven commerce.

Our medical paradigm

Traditionally we have used overtly medical language when talking about the human brain. The language of 'disease' and cure are being increasingly rejected by those with autism, dyslexia, dyscalculia and ADHD. We no longer talk of 'chronic' health but rather 'lifespan' health needs. The term 'Neurodiversity' when first coined in 1998 by Judy Singer, an Australian sociologist, and autistic person, argued that autistic people, - or the neurologically different, were a social category in the same way we categorise people by gender, race, sexual orientation and even social class.⁽²²⁾ Singer's thesis is rooted in the social model of disability, arguing that it is our environment and corresponding social mores that disable individuals. Singer stated that such naturally occurring variations in neurocognition challenges the traditional medical classifications of "normal" or "healthy" brain and the medical classification of autism as 'mental disorder'.⁽²²⁾

Research shows that autism and ADHD are not categorial but dimensional neurodevelopmental 'disorders' that are the result of brain dysfunction resulting in lifelong traits that are characterised by childhood developmental delay and subject to environmental influences in their presentation.^(20, 24) Clinical definitions provide clarity for medical practitioners, but the dimensional nature of neurodevelopmental conditions such as ADHD and autism, blur the boundary between what is medically 'normal'. Conventional approaches to diagnoses represent a change from the person's 'normal' that impairs daily functioning, resulting in reduced quality of life with a range of potential disadvantages. Neurodevelopmental conditions are in essence, a more extreme presentation of traits found in all humans, with no clear-cut boundary differentiating individuals with, from those without the conditions and with ADHD in particular, environmental factors are key when discerning the extent to which an individual is experiencing impairment. Context is everything - almost. However, different neurodevelopmental disorders also show marked phenotypic and genetic overlap.⁽²⁵⁾ There are correlations with physical health problems such as autoimmune and inflammatory illnesses as well as increased risk of developing some mental health problems such as anxiety, depression and vulnerability to PTSD and OCD for some people with ADHD and autism.^(19, 20, 25)

A neurodiverse paradigm suggests that there are no neurodevelopmental disorders but rather several different normalities, therefore neurodevelopmental disorders, and mental disorders appear to be mutually incompatible paradigms; difference does not in itself equate with disorder. Many Educational Psychologists have argued that ADHD in particular is social construct and not a medical concern, but such a position is taken through the lens of what a child needs in a school setting, without knowledge or consideration of the physical and psychological comorbidities.⁽²⁵⁾ Equally in the medical profession, many general health practitioners know very little about how neurodevelopmental conditions such as ADHD and Autism impact on physical and psychological well-being, nor do they understand the hidden financial cost of undiagnosed, unsupported ADHD and Autism in other public services such as education, social care and unemployment. The consequence of professional silo's is that neurodiverse individuals whose needs span different areas of public services experience unnecessary disadvantage and exclusion in several domains of living, if we continue to simply treat 'symptoms' rather than people or indeed define people by their diagnosis. The integration of public services is now an imperative as we move away from an over reliance on a purely medical model for those with neurodevelopmental conditions, toward a biopsychosocial model. The biopsychosocial model is an inter-disciplinary model that looks at the interconnection between biology, psychology, and socio-environmental factors, and how they impact on human development, health, disease, education, employability and relationships.



Further evidence of this move away from an overtly medical model is an emerging paradigm in health care focussing on prevention, healthy lifestyle choices, nutrition and an understanding of the impact of environmental stressors, such as pervasive learner anxiety in the school setting, workplace stress, economic and social stressors. This shift places greater emphasis on the link between emotional and physical health and prevention of illness to improve quality of life.⁽¹⁰⁾

Developing co-constructed clinical pathways requires understanding and agreed definitions of terms to categorise both the type of need and appropriate medical interventions. The current paradigms in the medical profession have developed specific terms based on differing assumptions about the nature of autism and ADHD which are used inconsistently by both public and clinicians. Government public health information websites often use overly pathologizing language that can elicit a passive helplessness and dependency that perpetuate health inequalities. The medical model and the language we use need not be incompatible with a neurodiverse paradigm and must therefore evolve.^(19, 20, 23, 24)

Neurodiversity calls on the medical profession to redefine disorder-based concepts, incorporating the concept of neurodiversity alongside mainstream research and clinical practice. There is no contradiction between traditional approaches that look to give neurodiverse individuals additional resources through clinical treatment, and neurodiverse approaches that look to adapt environments and transform attitudes and self-limiting beliefs; both approaches are beneficial and together will improve the lives of neurodiverse people. A biomedical approach will continue to have its place and we must ensure that the need for medical treatment is understood and accessible to people who may be vulnerable to coexisting physical and psychological health problems that correlate with autism and ADHD.^(19, 20, 24, 25) Central to this is participatory research into the coproduced design and delivery of health services that remove the power dynamics of deciding the most appropriate treatment or interventions. Shared decision making that views the individual as an asset in treatment plans, self-care and well-being, not a passive recipient of support is enabling. Intergenerational disadvantage from heritable neurotypes such as ADHD and autism, can be prevented when we counter the disabling stigma and exclusion of those with such *different minds*.



The challenge for the medical profession is also whether we position naturally occurring neuro phenomena such as dyslexia, autism, ADHD, dyslexia, dysgraphia, dyscalculia and sensory processing 'disorder' in the lexicon of neurodiversity rather than 'disorder' or 'disease' based taxonomy. What then of other neurotypes we still culturally as well as medically consider to be illness - such as depression, bipolar disorder, dementia? Currently neurodiversity is understood as the umbrella under which neurodevelopmental conditions such as dyslexia, ADHD, autism, dysgraphia, dyscalculia, sensory processing disorder and Tourette's syndrome are grouped as naturally occurring neuro-differences that have always existed in human beings. Some now propose that those whose neuro-differences that are not a naturally occurring phenomena, for example those that have been caused by trauma, such as foetal alcohol syndrome, traumatic brain injury or even mental illness, could be reclassified and included in the neurodiverse paradigm. My personal view is that we do need a distinction between naturally occurring learning differences and trauma, even though vulnerability to mental health problems for those with autism and ADHD and correlations with some physical health problems are important considerations.

In conclusion

Neurodiversity is an emerging paradigm that is creating a seismic shift in our cultural and scientific concepts of intelligence, ability, and our understanding of the diversity of human neurocognitive capabilities. This has resulted in a redefining of the broad spectrum of cognitive traits that we have traditionally termed neurodevelopmental disorders such as autism, dyslexia, ADHD, dyscalculia, dysgraphia, dysphonia, Tourette's, dysgraphia and sensory processing disorder. These differences are dimensional and therefore relate to cognitive processes that can be found in all human beings, but in approximately 20% of people, they present in a different or more pronounced form. This calls into question our traditional pathologising medical concepts of disorder or abnormality. Such neuro-differences are increasingly being seen as part of the naturally occurring spectrum of neurocognitive capabilities in humankind with an evolutionary purpose that reflect a universal design akin to that of biodiversity. Put simply, evolution requires difference, diversity and adaptability.

The influence of this change in our understanding is impacting on all business sectors and public services such as health, education and social care. The cultural impact and intersectionality of the neurodiversity movement is also political highlighting the socio-economic exclusion and marginalisation of those with autism, dyslexia, ADHD and other neurotypes. A neurodiverse paradigm asserts that neurological differences should be recognized and respected as a social category on a par with gender, ethnicity, sexual orientation, or disability status. Changes in public attitudes and in industry are empowering the neurodiverse neurominorities ensuring support and guidance to navigate successful, fulfilling lives, reducing dependencies and opportunity to pursue careers, economic independence and prosperity. It is this cultural shift that will drive changes in legislation and the structures and mechanisms that are necessary to implement systemic change. Industry and commerce have emerged as the front runners in driving legislative change. Inevitably governments and public services will respond to this cultural shift and respond to their electorates calls to legislate for equality, diversity and inclusion.

The neurodiversity canon is here. A rapidly evolving lexicon is changing the global conversation from disabling, stigmatising pathology and victim narratives, to a strength based, enabling paradigm. Thanks to the pioneering visionary work of many individuals and organisations, this paradigm shift is evident in the changes we are witnessing in our schools, universities, health services, high streets and industry. The world is a better place for it.



About the Author:

Dr Tony Lloyd is the CEO of the ADHD Foundation Neurodiversity Charity, - the largest user led ADHD & Neurodiversity Charity in Europe. Dr Lloyd is a co-author of six national reports and several expert consensus statements, research papers and patient information booklets. Dr Lloyd has lived experience of ADHD and is a leading voice and campaigner for a neurodiverse paradigm in health and education services and in industry.

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