Digital Scotland

Neurodiversity in Digital Technology
Summary Report
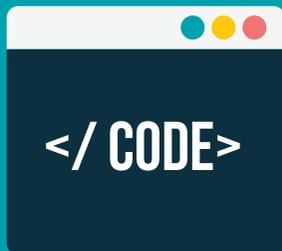
Contents

This report has been developed and funded by the Scottish Government through the Digital Scotland Business Excellence Partnership whose partners include Skills Development Scotland, ScotlandIS, Scottish Government, Scottish Enterprise, Highlands & Islands Enterprise, Scottish Funding Council, Scottish Qualifications Authority, Education Scotland and Digital Technologies sector representatives.

You can return to this page when you see this icon

The aim of this report

The scope of this report covers neurodiversity in the Scottish digital technology (tech) workforce and education pipeline. It looks at the skills, strengths and barriers associated with the neurodiverse conditions themselves. And it identifies how neurodivergent people can be attracted, recruited and retained in tech occupations which are best suited to the particular strengths inherent in neurodivergent people.

Further information on neurodiversity in the workplace:

• **ACAS** provides advice and guidance on the benefits of neurodiversity in the workplace, types of neurodivergence and how to make workplaces inclusive

• **The Equality Act 2010** also provides key useful information on inclusion at work and how to prevent discrimination.

Who made this report possible?

A range of people have given up their time to support the development of this report, by sharing their expertise, their experience and their insights. This includes many specialist organisations, community groups, projects and individuals, as well as Scottish employers. These organisations and individuals added a huge amount of value and this project would not have been possible without their input and support.

As lead partner for the Digital Technologies Skills Investment Plan, Skills Development Scotland would like to thank the neurodivergent people who provided guidance on the research tools to make sure they were right for the job. We would also like to thank the neurodivergent students and employees who agreed to be interviewed by the consultancy team and answered questions about their experiences of education, recruitment processes and employment. Without their input, this work would not have been possible.

As well as neurodivergent people, we involved people from education, employers, experts and organisations. We thank them for giving up their time willingly. We would also like to thank all the individuals and organisations who helped us organise the consultations with neurodivergent people and other stakeholders.

We would specifically like to thank ekosgen and Autism Network Scotland[1] for undertaking the research, and the organisations involved in the project steering group.

This report is based on research undertaken by ekosgen and Autism Network Scotland - Neurodiversity and Digital Skills Summary Report (2020).

If you would like further information about this research, please contact **ketty.lawrence@sds.co.uk**

Our use of words

Using guidance from the Scottish Government and the University of Strathclyde, we have used identity-first language throughout this report. We have used 'autistic person' when referring to autism, 'neurodivergent people' when referring to individuals and 'neurodiversity' or 'neurodiverse' in broader contexts, such as the conditions themselves.

1 Autism Network Scotland is based in the University of Strathclyde

Neurodiversity and digital technology in Scotland

Research shows 1 in 10 people in Scotland are neurodivergent. Many of them have strong skills and qualities, some of which can be particularly well suited to high-quality digital tech employment. But a considerable number of these people remain unemployed, underemployed or unsupported in education and employment. This represents a huge loss of talent.

Digital tech skills are in high demand across Scotland with a significant number of unfilled vacancies. These offer strong growth prospects and opportunities for high-quality employment.

There is a great opportunity to help meet the expanding need for digital tech skills by encouraging and supporting greater involvement of neurodivergent individuals at all stages of the tech talent pipeline.

1 Introduction and background

1 Introduction and background

This is a summary report of research into neurodiversity in the Scottish digital tech industry and digital tech occupations in other sectors.
It presents the findings from desk-based research and primary research with neurodivergent people, employers, people involved in learning and training, and other stakeholders.

Previous research identified a shortage of digital skills against growing employer demand and a need to create more diversity in the workforce. The forecast demand is for 13,000 vacancies a year in the digital tech skills sector in Scotland over the next decade. To meet this growing demand it is important that people from all groups can access the opportunities, including neurodivergent people.

Given the reported link between the attributes of some neurodiverse conditions and digital tech occupations, it is important to understand neurodiversity in digital tech occupations in Scotland, including the reported relationship between neurodiversity and skills that tech employers are looking for.

Table 1: Definitions of neurodiverse conditions

Condition	Definition
Autism	Autism is a lifelong developmental condition that affects how a person communicates, interacts and processes information. The autism spectrum refers to the range of ways the conditions can present in the individual which can vary greatly from person to person and throughout their life. While some people will have more subtle difficulties, others will have complex needs requiring more intensive support[2].
Dyslexia	Dyslexia is a learning difference primarily affecting reading and writing skills. Dyslexic people may also have difficulty processing and remembering information they see and hear which can affect learning and the acquisition of literacy skills[3].
Dyspraxia	Dyspraxia is a form of developmental coordination disorder, and is a common disorder affecting fine and/or gross motor coordination in children and adults. Co-occurring difficulties can include social and emotional obstacles as well as problems with time management, planning, personal organisation, memory, perception and processing[4].

2 Scottish Autism https://www.scottishautism.org/about-autism
3 British Dyslexia Association https://www.bdadyslexia.org.uk/dyslexia/about-dyslexia/what-is-dyslexia
4 Dyspraxia Foundation https://dyspraxiafoundation.org.uk/about-dyspraxia/

Table 1 (continued)

Condition	Definition
Dyscalculia	Dyscalculia is a specific and persistent difficulty in understanding numbers which can lead to a diverse range of difficulties with mathematics. It occurs across all age ranges and abilities[5].
Dysgraphia	Dysgraphia is a specific learning difficulty that affects written expression. It can appear as difficulties with spelling, poor handwriting and trouble putting thoughts onto paper. Dysgraphia can be a language based and/or non-language based disorder.
Attention Deficit Hyperactivity Disorder (ADHD)	ADHD is classified as a brain-based disorder characterised by a persistent pattern of inattention and/or hyperactivity and impulsivity. The brains of those with ADHD are typically under-stimulated. ADHD usually occurs over a person's lifetime and is not limited to children or males: the current diagnosis is around a 3:1 male-to-female ratio[6].

5 British Dyslexia Association
  https://www.bdadyslexia.org.uk/dyslexia/neurodiversity-and-co-occurring-differences/dyscalculia-and-maths-difficulties
6 Neurodiversity at Work – CIPD (2018) https://www.adhdfoundation.org.uk/

Treating each person as an individual

It is crucial not to stereotype. So it's important to note that neurodivergent people have conditions that present differently between individuals. The National Institute of Economic and Social Research highlighted this in a 2016 study which explained that there is a 'propensity for neurodivergent individuals to be stereotyped according to the more well-known characteristics of their condition'. The report stressed that not all individuals with autism are highly numerate, nor will everyone with dyslexia have insurmountable difficulties around functional literacy. Like any group of people there will also be rich diversity of backgrounds and characteristics, including ethnicity, gender and sexual orientation.

Study purpose and aims

This study aims to understand how we can increase neurodiversity in the digital tech pipeline and workforce. The research will be used to inform skills planning initiatives through the creation of an action plan which will enable us to work with partners to increase neurodiversity in digital tech in Scotland.

The key aims of this study are to understand:

- the strengths and challenges associated with neurodiverse conditions and the opportunities this presents for digital tech employment

- to what extent neurodivergent people are represented in the digital tech workforce and supply pipeline in Scotland

- what barriers exist to increasing neurodiversity in the digital tech workforce

- what is already being done to help overcome these barriers and improve neurodiverse representation, and identify best practice and required action areas.

Study approach

- A desk-based review of secondary research, reports, data and information.

- A primary research programme with different groups, including neurodivergent people in tech occupations, in STEM education/training, employers of neurodivergent people, key informants, and education and training providers. It was particularly important to include neurodivergent people in the primary research and to pilot questionnaires with them.

2 Neurodiversity in Scotland

Data gaps

This research has given us very valuable information and insights, and drawn on all available data. However, there are persistent and significant data gaps.

Table 2 shows what data is available and where the gaps are. It is clear that more research at the Scotland level is required. While there is good data available for autism, gaps exist to varying degrees across each of the remaining neurodiverse conditions, particularly dyspraxia, dyscalculia and dysgraphia.

Table 2: Data gaps in neurodiversity

Condition	General population	School	College/ university	Employment
Autism	Available at Scotland level	Available at Scotland level	Available at Scotland level	Available at Scotland level
Dyslexia	Available at Scotland level	Available at Scotland level	No data available	No data available
Dyspraxia	Global estimate available	No data available	No data available	No data available
Dyscalculia	Global estimate available	No data available	No data available	No data available
Dysgraphia	Global estimate available	No data available	No data available	No data available
ADHD	Global estimate available	Available at Scotland level	No data available	No data available

Neurodiverse conditions in Scotland

Neurodivergent people represent an estimated 10% of the overall Scottish population[8]. There is currently no robust evidence on the breakdown of each neurodiverse condition in Scotland or data on the number of people with multiple conditions (also known as co-occurrence). For some conditions, understanding of, and research into, the condition is at an early stage. To date, research and data in Scotland has tended to focus on autism and dyslexia.

It's also likely there are a substantial number of people in the population that have a neurodiverse condition but are not diagnosed or choose not to disclose it. So we need to consider and address education and employment barriers for different groups:

• those who are diagnosed and disclosed
• those who are diagnosed and undisclosed
• those who are undiagnosed and undisclosed.

10%

of the Scottish population are neurodivergent
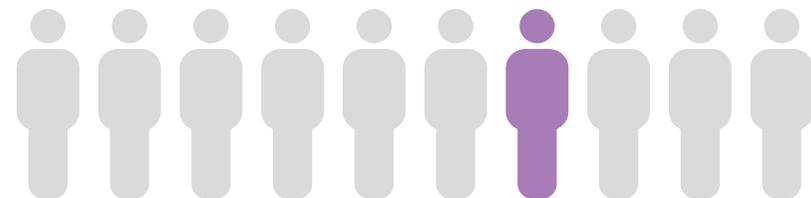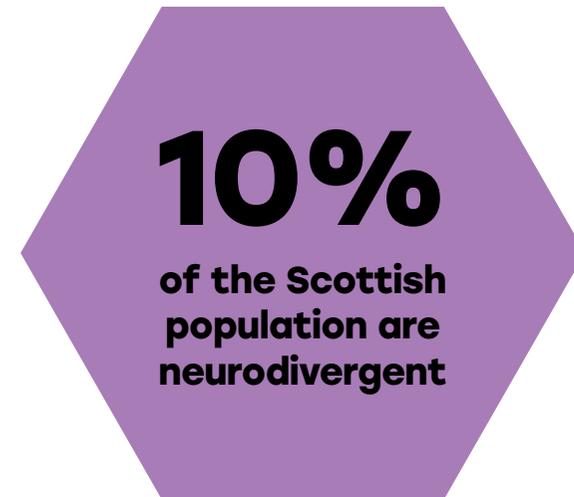
8 Neurodiversity at Work – CIPD (2018)
   https://www.cipd.co.uk/Images/neurodiversity-at-work_2018_tcm18-37852.pdf

In fact, given some of the barriers are faced by the general population as a whole, understanding and removing the barriers for neurodivergent people will also benefit neurotypical people.

Using national and international research data, the estimated prevalence of each neurodiverse condition is shown in Table 3 along with the actual number it equates to in Scotland.

Table 3: Estimated prevalence of neurodiverse conditions

Condition	Prevalence	No. of people in Scotland
Autism	1 in 97 (Scotland)	47,000
Dyslexia	1 in 10 (Scotland)	544,000
Dyspraxia	1 in 17 (global)	321,000
Dyscalculia	1 in 20 (global)	273,000
Dysgraphia	1 in 5-20 (US)	273,000-1.1m
ADHD	1 in 29 (global)	154,000

Neurodiversity in employment, education and training

The data gaps shown in Table 2 make it very difficult to accurately assess the prevalence of the various conditions at different stages in the digital tech education pipeline, in employment overall and in specific sectors. We are seeing a growing understanding about neurodiversity and a growing interest and commitment to addressing the challenges that some neurodivergent people face. However, there is a lack of consistent and comprehensive information which would be beneficial to help develop evidence-based actions.

Lost employment opportunities

Demonstrating the low employment rate amongst autistic people, only 32% of autistic adults are in paid work compared to 76% in the UK population as a whole[9]. The cost of lost employment for autistic adults in the UK is estimated at £9bn per year[10] and there are also social costs.

"Many autistic people are simply brilliant people – highly educated, highly capable, detail-oriented, yet unemployed."

Tech Employer

9   An Internship Programme for Autistic Graduates at Deutsche Bank – CRAE (2017)
10 Ibid.

The desire versus reality gap

A 2016 survey by the National Autistic Society found that only 16% of autistic adults were in full-time employment with a further 16% in part-time roles in the UK[11]. However, over 75% of autistic people would actually like to work full-time[12]. Compounding this, 40% of autistic people working part-time reported feeling underemployed and that they would like to work more hours. This clearly shows that there are autistic people who would like to be employed and to work full time, and they are an untapped pool for employers to recruit from.

In 2017 the Scottish Government conducted a survey of over 400 autistic people aged 16 or over in Scotland, and found that 28% were in full or part-time employment, with 69% unemployed.

28%
in full or part-time employment

69%
are unemployed
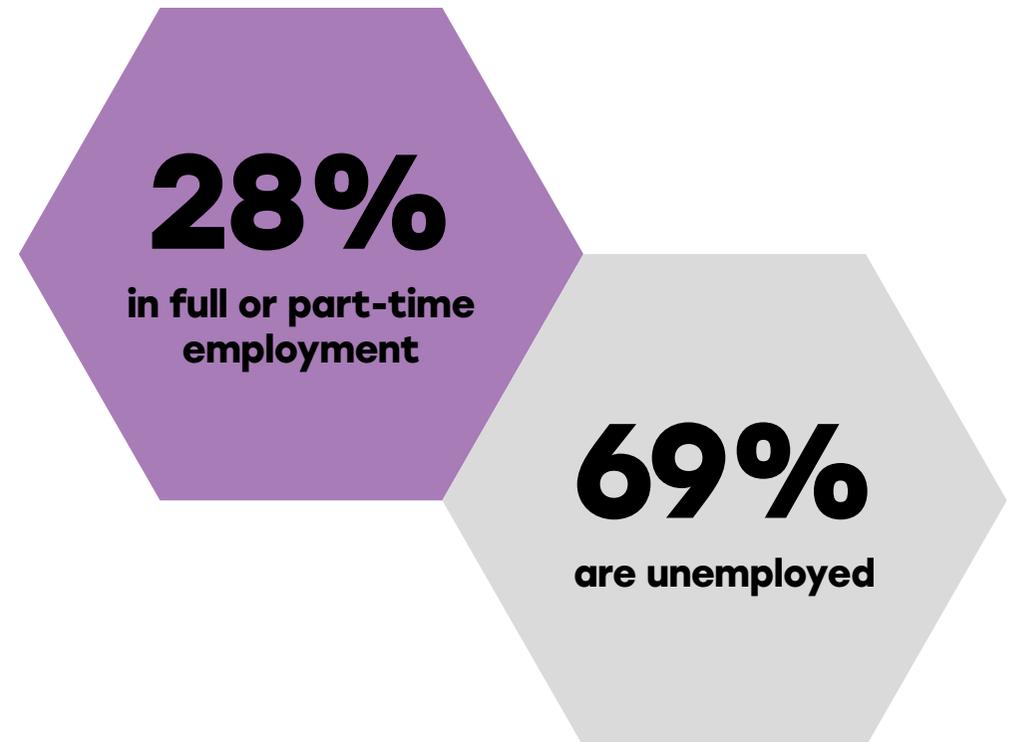
11 The Autism Employment Gap – The National Autistic Society (2016)
    https://network.autism.org.uk/sites/default/files/ckfinder/files/NAS%20TMI%20Employment%20Report%2024pp%20WEB%20(002).pdf
12 Autistic adults sought for tech jobs in Scotland – BBC News (2019)
    https://www.bbc.co.uk/news/uk-scotland-scotland-business-47197918

Neurodiversity in technology

Figure 1 shows that in the National Autistic Society's 2016 survey of autistic adults, 10% of people who responded said that their ideal job was to work in IT[13]. It was the second most popular after the arts/acting. However, the findings illustrate that neurodivergent people are attracted to a range of roles and sectors. While this report focuses on digital tech, it is important not to make assumptions as autistic people have a wide range of different aspirations outside of the arts and technology.

Figure 1: Ideal industry to work in

Source: The National Autistic Society – autism and employment survey (2016)
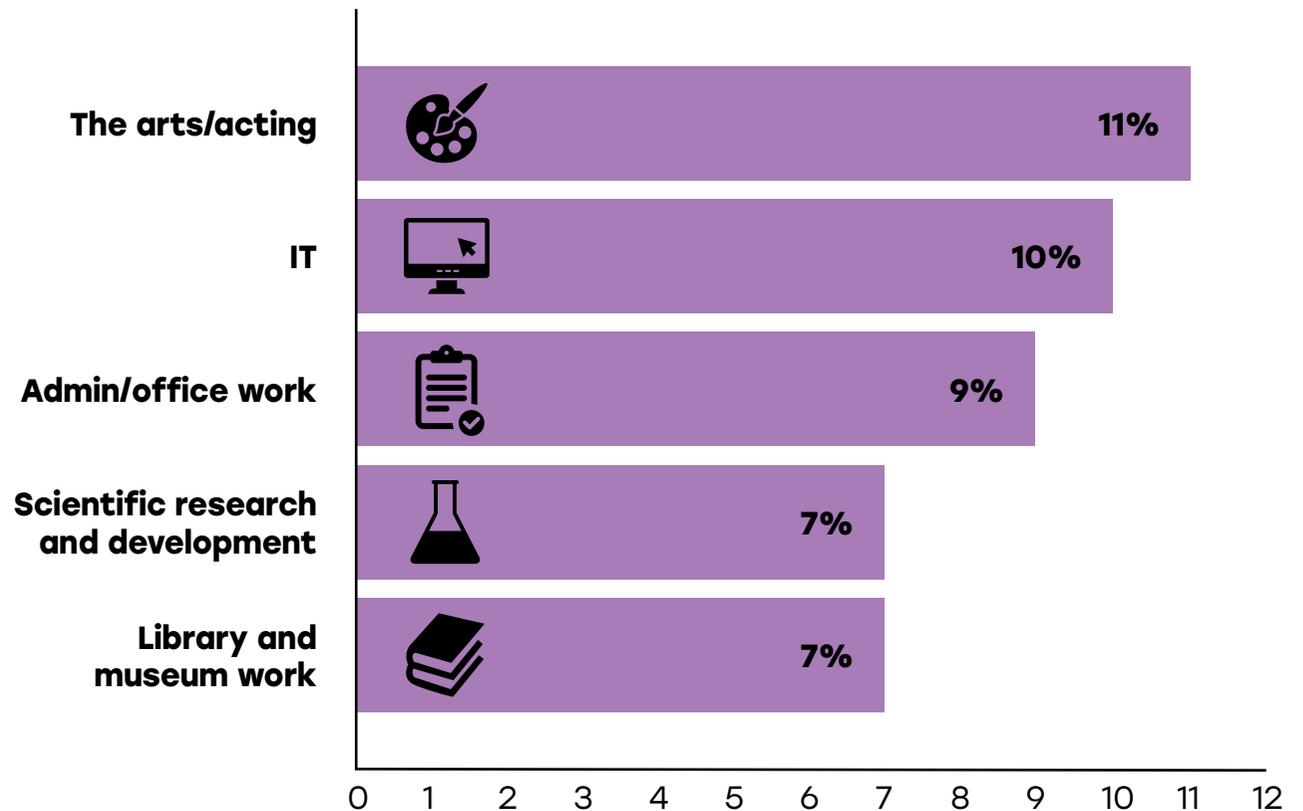
13 The Autism Employment Gap: too much information
– The National Autistic Society (2016)

3 Neurodiversity and technology skills

Specific strengths, skills and traits of neurodiverse conditions

Neurodivergent people are not a homogenous group. Like neurotypical people they have different characteristics, strengths, skills and perhaps most importantly, interests. Although we do not want to make assumptions or stereotype, and appreciate that neurodivergent people possess a wide range of skills suited to a variety of roles[14], a key part of the research was to identify if there is evidence of specific strengths and traits associated with neurodiverse conditions. And, if there are, what they are. We then looked at how they relate to digital tech roles and occupations.

Table 4 sets out the specific traits, skills and strengths that the research indicates are associated with neurodiverse conditions and are a good fit with tech occupations and settings.

Table 4: Specific traits of neurodiverse conditions

Autism	ADHD
• Logical thinking • Strong ability to focus and concentrate for long periods of time • Assimilate and retain detailed information • Attention to detail • Reliable, dedicated and loyal	• High energy levels • Hyper-focus • Highly creative and inventive • Behaving spontaneously • Entrepreneurship

14 The brand benefits of neurodiversity – Marketing Week (2017) https://www.marketingweek.com/brand-benefits-neurodiversity/

Table 4 (continued)

Dyslexia	Dyspraxia
• Very good 'on the frontline' • Inventive and creative • Established link with entrepreneurship • Ability to see the big picture ('out-of-the-box thinking') • Visually manipulating 3D objects/images • Pattern-spotting and working with complex datasets	• High verbal abilities • Strategic thinking and problem-solving • Strong episodic memories • Highly motivated, determined and hardworking ethos

Source: Composite findings from ekosgen consultations and literature review

"Undoubtedly some neurodivergent people have particular skills that are suited to, for example, cyber security and software engineering. Other autistic people are not interested in tech and tend to show more aptitude for creativity – and prefer it."

Key Stakeholder

"Autistic people are naturally good at shortening processes, finding solutions, seeing how things could be better."

Neurodivergent Employee

"Autistic staff are fastidious from start to finish."

Tech Employer

Relationship with tech roles

The study identified a range of positive traits linked to neurodiverse conditions that can benefit tech businesses. Table 5 summarises these and the different roles that they can be applied to. It is drawn from the literature review and the qualitative research with employers, neurodivergent people and specialists. It is not exhaustive. It's designed to give a flavour of the traits and how they correlate to some roles. There is also crossover between traits and roles.

Table 5: Skills associated with neurodiverse conditions and relationship with tech jobs

Key neurodiverse skills	Technology roles
Creativity and innovation	Design Gaming/games development Product and process development Software development Business development/sales
High levels of concentration and the ability to work on repetitive tasks	Software quality assurance Software testing Image analysis Cyber security Compliance

Table 5 (continued)

Key neurodiverse skills	Technology roles
Methodical and focussed on details	Identifying defects in software, websites, and graphic projects Data analytics Programming Coding Compliance
Pattern recognition and identifying anomalies	Data analytics Cyber security Quality assurance
Investigative nature and inquisitive mindset	Cyber security Testing
Understanding rules and sequences	Computer programming

Source: Composite findings from ekosgen consultations and literature review

Benefits of a neurodiverse tech workforce

Neurodivergent people can be extremely successful and valuable in STEM areas, with Elon Musk, Steve Jobs, Barbara McClintock and Bill Gates being arguably the most high profile. There are undoubted benefits for tech employers in Scotland of attracting and retaining a more neurodiverse workforce and supporting neurodivergent people as entrepreneurs.

- By promoting employment opportunities to more neurodivergent people, employers can recruit from a wider pool and attract talent into their organisation.

- Qualitative evidence points to higher than average productivity amongst neurodivergent employees. However it's important to recognise that to date this evidence generally relates to autism. JP Morgan Chase found higher productivity amongst their Autism at Work recruits.

- Evidence suggests that neurodivergent people can be very loyal as they tend to be resistant to change. This means that once they are in a job and workplace that suits them they are likely to stay in it. As an example, Hewlett Packard Enterprise has seen a 98% retention rate among its autistic workers – much higher than baseline retention rates15[15].

- Equality and inclusion are very high on the policy agenda and so being able to demonstrate that an organisation is an inclusive employer is a benefit in itself. It can make organisations more attractive to potential recruits, customers and clients, be good PR and enhance overall work-based satisfaction for current employees.

15 Software firms are actively seeking 'neurodiverse' employees – Venture Beat (2017)
https://venturebeat.com/2017/05/07/software-firms-are-actively-seeking-neurodiverse-employees/

- The fact that neurodivergent people have different thought processes to neurotypical people means that neurodiverse teams will think in different, often innovative, ways. This allows them to approach tasks and problems from new angles, offer more balanced views and apply their strengths and attributes to their roles differently. This strengthens the workforce overall and results in greater innovation and creativity in, for example, problem solving and product and service design[16].

"A neurodiverse team is better at protecting an organisation as they see things from different viewpoints"

Tech Employer

- Ensuring that neurodivergent people can benefit from tech employment opportunities is vital. It will provide access to high value, reliable and satisfying jobs, and career progression. As well as financial stability, good quality employment delivers softer benefits such as reduced isolation, increased confidence, positive social networks, structure, and enhanced physical and mental wellbeing.

16 Neurodiversity at Work – CIPD (2018)

4 Overcoming challenges and developing best practice

If Scotland is to capture the benefits of a more neurodiverse tech workforce, employers and workforce and skills planners need to understand the barriers and challenges faced by neurodivergent people at each stage of the pathway. Then they can put in place mechanisms to tackle them. This will cover education and learning as well as employment and progression. The research evidence indicates that the steepest barrier faced by neurodivergent people is at the employment recruitment stage.

The research identified the following barriers and challenges. It also provided some good examples of best practice in overcoming these barriers for neurodivergent people, education providers and employers in the digital tech education pipeline and workforce.

In education and training

The education system can be particularly difficult for neurodivergent people to navigate and progress in. There is a higher than average incidence of under-achievement, disengagement and under-representation in tertiary education, along with non-completion[17]. The barriers are a complex interplay of different factors. Many of these will require fundamental changes to how education is structured and delivered, and how abilities and potential are assessed.
The three main areas highlighted by the report are shown below.

Changing attitudes

Increasing awareness and overcoming the attitude of people who do not have a good understanding of neurodiverse conditions and how neurodivergent people react to challenging behaviours.

There are a range of training and learning opportunities available to education providers and employers to help them better understand neurodiversity. At the moment, understanding and awareness still remain low.

A better gender equality

Gender stereotyping at school can mean that girls are encouraged to do more 'traditional' subjects, such as English, maths or languages. The Scottish Women's Autism Network reports that this limits the number of females studying tech. It therefore exacerbates the gender imbalance in the tech sector and works against autistic girls who may be more interested in tech but may be pushed towards other options.

Making assessments more inclusive

A barrier for neurodivergent learners at school, college or university can be the way they're taught and their progress and achievements assessed. For example, group working assignments can be a challenge for autistic people and people with ADHD, while written assessments can be a barrier for learners with dyslexia, dyspraxia or dysgraphia.

A very strong message is that if education systems become more inclusive of neurodivergent people, they will be much more inclusive generally and all education providers, employers, applicants and employees will benefit.

17 Not included, not engaged, not involved – Scottish Autism (2018)

"Creating a system for neurodivergent people would mean that we have a system that would work for everyone."

Key stakeholder

As an example, Edinburgh Napier University runs an inclusive practice programme to remove barriers for all students and staff. It comprises bespoke learning profiles for each student, advice to lecturers on how to support neurodivergent students and funding for some neurodivergent students to bring a support worker to classes with them.

Recruitment processes

There was general consensus from respondents that recruitment is the greatest barrier for neurodivergent people. Typical recruitment processes are not always suited to neurodivergent people and can deter them from applying or hinder their performance. This means making the move from education to employment can be challenging for neurodivergent people.

Making sure job adverts are inclusive

The way that jobs are advertised and described can cause neurodivergent people to exclude themselves and not even apply. Employers often use vague, unspecific words and phrases that neurodivergent people can find difficult to interpret. There can be emphasis on requirements that may not be crucial for some roles such as 'team working' and 'good communication skills'. Neurodivergent people may not interpret these 'asks' in the same way as neurotypical people. They may take them very literally as essential criteria, believe that they cannot demonstrate these skills and so not apply.

29

It is therefore important to carefully construct and clearly articulate job specifications. They should be succinct, to-the-point, avoid implied language, and have essential criteria and eligibility that are directly relevant to the role. This will help to encourage applications from neurodivergent people who would be excellent candidates, but may otherwise have been discouraged.

Get the best people for the job
Recruitment processes can be inflexible and unconsciously work against neurodivergent people. This can be to the detriment of employers and neurodivergent people by excluding or filtering out potentially valuable candidates. For example, written applications may discourage dyslexic or dyspraxic people and not allow neurodivergent people to demonstrate their strengths or even have the confidence to apply. The traditional way interviews are organised and undertaken can be challenging for neurodivergent people and competency-based interviews can be particularly difficult for autistic candidates. This is especially noticeable when questions are not framed clearly, for example, 'have you ever been in a situation where...?'

Making the interview suitable for the candidate
The interview environment is important for employers to consider. Neurodivergent people can be easily distracted and sensitive to environmental factors such as light, sound and peripheral activity. Employers need to think about where and how they meet applicants, the information that applicants may need in advance to ensure optimum performance, and how to accurately assess skills and abilities.
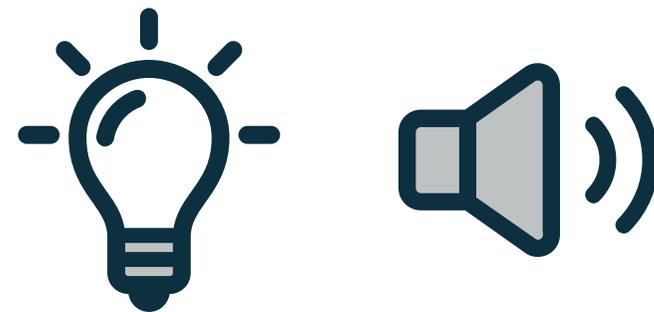
Improving the recruitment process

Examples of overcoming these barriers at the recruitment stage include:

- the employer encouraging disclosure of neurodiverse conditions on applications and showing that they are willing to offer reasonable adjustments

- providing interview themes and questions in advance

- providing information or photos of the interview building and interviewer in advance

- either offering alternative forms of assessment, for example practical assessments or computer-based exercises, or taking into account a candidate's condition when reviewing results.

Would a practical interview work better?

Practical assessment may be a more effective way of assessing a neurodivergent candidate's skills and abilities. Assessments should fit the job being recruited for and should have in place the adjustments that the individual requires. Or, failing that, the assessment of competence should take account of the impact of the lack of adjustments.

In the workplace

Many tech workplaces are busy and use open-plan offices. This can provide social and sensory challenges for neurodivergent employees, particularly autistic people. This means that as well as neurodivergent people facing barriers, employers can also face barriers in employing neurodivergent people.

Sensory environment
Some tech workplace environments can be difficult and off-putting to neurodivergent people. There are tangible issues such as distractions from lighting, noise and movement. Hot-desking and disorganisation can be stressful for neurodivergent people, particularly autistic people.

The solutions to these can be fairly straightforward and inexpensive. Things like offering ear defenders, providing fixed desks, allocated car parking spaces and changing the lighting (for example, using Wi-Fi light bulbs). In the research it became clear that many of the required adjustments are already relatively common practice in digital tech and other work environments.

Workplace culture and awareness raising
It is crucial that digital tech workplace culture is not difficult for neurodivergent people. An important part of this is the understanding and attitude of colleagues. Some neurodivergent people can appear socially awkward and find it hard to understand and fit into regular workplace culture. If tech employers are to gain the undoubted benefits of a more neurodiverse workforce then they must ensure that managers, supervisors and the wider team members understand and value neurodiversity and respond appropriately.

Helping people understand neurodiversity
Providing staff awareness training on neurodiversity is good practice and can help to foster a more accepting, understanding and less prejudiced workplace culture. It can help neurotypical employees to more effectively communicate with and work with neurodivergent colleagues. This is important for leadership, management, employers and interviewers.

Workplace support

It is also essential that neurodivergent employees are provided with guidance and support to understand some of the behaviours and attitudes that they are likely to observe in the tech workplace. This will help them accept what they may interpret as unacceptable non-compliance.

'Buddy systems', where a new recruit is buddied with a colleague who isn't their line manager, can be very helpful for neurodivergent people. The buddy acts as a source of support and advice, providing guidance and opportunities to discuss issues within this informal relationship. It is a 'safe place' to raise concerns and explore solutions. JP Morgan Chase and Sopra Steria implemented a buddy system specifically for autistic staff. Dell allows neurodivergent applicants to bring a buddy to interviews.

Overall, the research clearly shows that many adjustments and changes to recruitment and in the workplace are quick, simple and inexpensive to implement. In addition, many of these adjustments will benefit the entire pool of candidates or workforce, whether neurodivergent or neurotypical. They therefore make good business sense for everyone.

5 Priorities for action

This research has identified priorities that will help to enhance neurodiversity in the digital tech workforce in Scotland. These will help all interested parties develop an action plan.

Priority 1: Build the evidence base

We need to support strategy and decision makers to help them understand neurodiversity and how it can help in digital tech jobs. This report is the first step in helping to provide this support.

The primary and secondary research stages of this study have shown there is a generally good understanding of autism (and, to an extent, dyslexia), its prevalence in the population and the skills and traits associated with it. However, the other neurodiverse conditions covered in this report (ADHD, dyspraxia, dyscalculia and dysgraphia) are much less researched and understood. Data on the prevalence of these conditions is minimal at best and there is very little data on education or employment outcomes for people with these neurodiverse conditions. Further research to find the prevalence of these conditions, and traits and strengths that can be associated with them, will help to strengthen understanding and the link between conditions and digital tech skills needs.

Priority 2: Raise awareness

There is a clear need to raise awareness about the value of neurodivergent people in digital tech, and to the Scottish economy as a whole. A plan should be developed to achieve this using a range of media and routes. It will require clear, consistent messaging and understanding of the target audiences. It should incorporate findings from this work and consider it from two angles:

• encouraging employers to consider how they can better attract, recruit and retain neurodivergent people into the tech workforce

• encouraging neurodivergent people to consider career options and feel confident to move into tech training, education or employment.

Priority 3: Helping education be more inclusive

As part of the pipeline of neurodivergent people entering and progressing into the tech workforce, work is required with education providers to raise awareness of how neurodivergent learners can be best supported. Data indicates that neurodivergent people remain under-represented in education overall and can find it hard, for various reasons, to complete qualifications.

We require a more flexible gateway for college and university courses that better captures potential as opposed to relying simply on qualifications achieved, for example, at school. This could be explicit within the Fair Access agenda[18] and the individual HEI strategies. Linked to Priority 4, learning and assessment should be person-centred, with a menu of options that the individual can engage with. For example, options other than group work, a range of formats for submissions and testing, and so forth.

To achieve this, consideration should be given to preparing a neurodiversity toolkit for tech education providers. This should be coupled with awareness-raising activity to influence and make sure that there is a clear understanding of neurodiversity and how neurodivergent students can best be supported to succeed in tech and other STEM subjects.

18 https://www.fairworkconvention.scot/

Priority 4: Being flexible for each individual

Flexibility and personalisation mean taking a person-centred approach at each stage of the education and employment pipeline. This requires processes that can be adapted and flexed in response to the particular need of an individual; in this case, a neurodivergent individual.

It's about understanding their needs and having the mechanisms and commitment to respond positively. We need to raise awareness with tech employers, so they can understand that the adjustments are not necessarily expensive or time consuming. Examples include asking candidates if they have any particular needs in terms of an interview environment, providing interview questions in advance and offering alternatives to traditional interviews such as practical assessment.

Priority 5: Helping digital employers embrace neurodiversity

A key priority is for tech employers of all types and sizes to clearly understand the benefits that a more neurodiverse workforce can deliver. Tech employers should be given information and practical actions to question and adjust their recruitment process and the tools and materials they use, for example job descriptions and interview questions. This could be done through awareness-raising sessions, case studies, and by linking employers to experts who can support them. Tech employers should also be provided with information and examples of the sorts of adjustments that they could make to ensure that the workplace is suitable for neurodivergent individuals. This includes making it clear that even person-centred adjustments are quite minor, not disruptive and they are quick, easy and inexpensive to implement.

Signposting tech employers to sources of information and advice about employing neurodivergent people would help them to overcome some of the barriers they may perceive. This should include access to training and information for the wider workforce about creating a supportive, non-judgemental culture that recognises and actively welcomes diversity and demonstrates inclusiveness.

Priority 6: Championing neurodiversity in the tech sector

This research shows the need for more work to be done to ensure a sustainable and more neurodiverse tech workforce in Scotland. The study Steering Group has been very effective in commissioning and managing the work to date. It is now time to consider how the findings are used and the mechanism for driving it forward and monitoring progress. This will include considering which organisations can and should take a role in driving action and how to ensure that tech employers and industry are involved.

Next steps

These priorities have been identified to allow us to develop an action plan. By working with partners we will help more neurodivergent people consider and become involved in digital technology education, training and careers. The key to making progress is for partners and stakeholders to work together. We aim to drive this discussion.

As noted, the report covers digital technology in Scotland and looks at the skills, strengths and barriers associated with neurodiverse conditions. Other factors associated with neurodiversity are not covered in the scope of this report. ACAS offers further information on the benefits of neurodiversity in the workplace, types of neurodivergence and how to make workplaces inclusive.