Transforming Education for Personalized Learning

Neurodivergent Learners

Neurodivergent Learners:

Inclusive and Accessible Practices in Higher Education

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ABSTRACT

An increasing number of students in Higher Education are neurodivergent, shaping and challenging the practices of how staff teach in Higher Education. This chapter seeks to outline why Higher Education staff should meet the needs of neurodivergent students, and how this can be done. This chapter begins by outlining the relationship between biodiversity and neurodiversity is outlined and definitions are provided for neurodiversity and related terms. Second, barriers neurodivergent students may face. Finally, Universal Design for Learning is presented as a vehicle for inclusive and accessible practice, with clear examples of how this relates to neurodivergent learners. The chapter thematically reports the needs of neurodivergent learners based on both the knowledge and experience of the authors, as well as from other neurodivergent students. The themes are: considered communication; technological assistance; be predictable and meet expectations; normalise everyone's needs (or rather, normalise neurodivergence).

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Keywords: neurodiversity, teaching, learning, higher education, inclusion, accessibility

Introduction

An increasing number of students in Higher Education are neurodivergent, shaping and challenging the practices of how staff teach in Higher Education. This chapter provides a review of the literature to date on inclusive and accessible practices in Higher Education for neurodivergent students, and explains the importance of such practices through linking them to reflexive teaching practice (see Brookfield, 1993) and Universal Design for Learning. In this chapter, information is provided on creating an accessible and inclusive learning

environment. First, the relationship between biodiversity and neurodiversity is outlined and definitions are provided for neurodiversity and related terms. Second, the chapter will explore the barriers neurodivergent students may face. Finally, the focus turns to Universal Design for Learning as a vehicle for inclusive and accessible practice, with clear examples of how this relates to neurodivergent learners.

The approach to this chapter

The chapter presents a review of the literature to date, with findings from the review from other neurodivergent students. A survey was used as a verification. The data collection gained a favourable ethical opinion from the University of Sunderland in August 2023. The names provided are pseudonyms that were selected by the participants sharing their experiences. 8 respondents completed a Qualtrics survey (https://universityofkent.qualtrics.com/jfe/form/SV_5oHfaBVwfB81ASa) asking about their time at University. All participants were based in UK universities, including across the principalities of Wales, Scotland and England. In collecting data, only the respondents' neurodivergent identity/ies, a pseudonym of their choice, and their experiences were asked. Participants were welcome to participate with a diagnosis, or who self-identify as neurodivergent. In the survey, the inquiry focused on what had worked, what has not worked and what they would like Higher Education staff to know in three areas: curriculum design, assessments and the learning environment. There was also space at the end of the survey for other thoughts and experiences participants wanted to share. The chapter uses these insights to support the findings from the literature review. Quotes from the individuals who filled out the survey are provided.

Rationale for confirming the review with neurodivergent voices

As part of being a reflexive educator (Brookfield, 2017; Perryman et al., 2017; Soisangwarn & Wongwanich, 2014), listening to the needs and voices of those university staff work alongside is imperative. Listening to the needs and voices of neurodivergent students may challenge both paradigmatic (fundamental assumptions about how things are) and prescriptive (how people should do things) assumptions of the type of student in the classroom, and how people should teach (Brookfield, 1993). This echoes the gravity of critical neurodiversity studies (Rosqvist et al., 2020) and critical autism studies (Woods et al., 2018), which questions ways that neurodivergent people are described and understood. This departs from the core assumptions of 'neurominority' grounded in pathology (compared to the 'neuromajority').

Previous literature has demonstrated the importance of neurodivergent identity in understanding neurodivergent marginalised perspectives and why listening is crucial (Waldock, 2021; Jacobs 2022; Waldock, 2023). There exists not one sole 'neurodivergent experience' (Rosqvist et al., 2020, p2; Walker, 2021), with neurodivergent people having differing support needs within the classroom. For example, some neurodivergent people may need complete silence to concentrate, and others might need to talk. Hal describes how some educators he has had have tried to make the classroom fully inclusive, without reflecting on how different student's support needs may clash.

'Sometimes, in an admirable effort to make room for all different kinds of students, it is possible to make things harder for autistic students, who would benefit from more clearly-defined structure and expectations' - Hal

Hal's experience also shows how in order to meet each individual's needs, staff need to avoid a tick box approach, whereby staff do what they think people need rather than meet each individual's needs. The fact that there does not exists one sole 'neurodivergent experience' (Rosqvist et al., 2020, p2; Walker, 2021) may be perceived as a problem by some educators, with some educators seeking quick resolutions positivist and tick box approaches to 'solving the problem of neurodivergence in the classroom' (e.g., Applied Behaviour Analysis: Axelrod et al., 2012). This is why, in part, this chapter presents other neurodivergent learners to verify findings from the academic literature, and make them specific to neurodivergent learners. In addition, Hals' experience illustrates how learning about different support needs within the classroom is a vital part of reflexive practice. Anne echoed Hal's experience:

'Increased staff understanding of ~~ND~~ [neurodivergent] processing differences is vital' - Anne

Knowledge of how learners might experience learning and the classroom environment can help improve both experiences within the classroom and university (Dwyer et al., 2023). Part of one of the differences Anne refers to is the double empathy problem (Milton, 2012), whereby individuals with different experiences of the world and expectations struggle with reciprocity in understanding each other. Previous literature exploring inclusive pedagogy for neurodivergent students (e.g., Hamilton & Perry, 2023; Spaeth & Pearson, 2023) have exemplified the importance of the double empathy problem on neurodivergent people's experiences within higher education.

Part 1: Biodiversity and Neurodiversity

Neurodiversity is comparable to biodiversity. The concept of biodiversity provides a useful springboard as an introduction to neurodiversity, as the natural world is full of diversity (Wilson, 1985; on neurodiversity: Chapman, 2021; Manalili et al., 2023; Stenning & Rosqvist, 2021). Biodiversity refers to the different forms of life that are found within an area that interact with one another and the physical world (Swingland, 2001). There are a variety of ways to consider diversity. For instance, analogous to biodiversity is neurodiversity as it is akin to human diversity. There is a great extent of human diversity in the world, such as cultural diversity and social diversity (Anderson, 1996; Berry, 1982; Lonner, 1994). Human diversity means that the world contains a variety of specific personal characteristics that are different to each other, making every person unique and different. Cultural diversity refers to each person's ethnicity and cultural norms associated with it, and from where they are raised (Gordon, 1992; Silberman, 2017). The world also contains single cultures, from which diversity occurs within; this is social diversity (Berry, 1982). This relates to lifestyle, religion, language and preferences; all of which is clearly relevant to Higher Education.

Neurodiversity is neurological diversity; the diversity of human brains and cognition, and refers to the different forms of neurology that can be found within a group of people,

including their interactions with one another and the physical world (Chapman, 2020; Stenning & Rosqvist, 2021; Walker, 2021). The term neurodiversity is like how biodiversity is across the natural world, it is across the human population. Consequently, human diversity includes neurodiversity as part of the difference between one another. Specific personal characteristics are varied between one another, including everyone's experiences, interactions with the world, highlighting that there is no correct way to think, be, learn or behave (Kapp et al., 2013; Walker, 2021).

Importantly, neurological differences change how one perceives the world (Walker, 2021). This is really key because this is what is proposed needing to be addressed in some way in higher education. This is due to how this could alter one's values, even potentially producing different cultures. This links to cultural diversity, about cultural norms and how people are raised. In addition, there is a need to think about the intersection of cultures, and the mix of various cultural diversity; within which, this factor for people that have a neurological difference changes how they would be in the world. For example: a Tibetan person that is neurologically different may perceive norms and values as more or less important related to their needs and experiences, but embedded within that culture. Therefore, there are obviously going to be some considerations required around what is 'normal' and what is 'normal' within that culture. What is considered 'normal' is based on social construction (Chaney, 2022). Returning to the example, 'normal' within the culture would be based on the social construction of norms situated within that specific culture that has developed. From this point, it is necessary to add in how that person would perceive the world, and how this would impact how they perceive the world, and how they would relate within the world.

A selection of neurodivergent identities and experiences are outlined in table 1. Table 1 does not have a conclusive overview of every neurodivergent identity and experience, however it does provide some of the identities and words that are used. It is important to note here there is no overriding inclusion or exclusion criteria for which experiences or identities are neurodivergent (Walker, 2021), with the important facet being cognition diverging from the norm. In addition, someone can be neurodivergent from birth (e.g., an autistic person), or have acquired neurodivergence (e.g., mental health conditions).

Table 1. A list of neurodivergent identity or experiences, some of which are diagnosable

Neurodivergent identity/experience
ADHD*
Autism*
Dyslexia*
Dyscalculia*
Dyspraxia*
Tourette's Syndrome*
Epilepsy*
Obsessive-compulsive disorder*
Mental health problems*
Intellectual disability*

Meares-Irlene syndrome*
Hyperlexia
Synthesthesia
Cystic fibrosis**

Note: *signifies an identity or experience where an individual can receive a diagnosis. **this may or may not be deemed neurodivergent, see the brief discussion below.

Terminology

It can be a challenge to use the right words when referring to different groups of people, especially with a potential lack of consensus. Throughout history terms change, from what was once acceptable to what no longer is appropriate (Botha et al., 2021; Brueggemann, 2013; Keates, Martin, & Waldock, in press). Currently, an individual is neurodivergent when 'having a mind that functions in ways which diverge significantly from the dominant societal standards of "normal"' (Walker, 2014). However, when describing a group of individuals that include neurodivergent and neurotypical people, the group is neurodiverse (Walker, 2014). Neurotypical people are those that are the 'neuromajority' and perceived as not neurologically divergent.

In regards to how different neurodivergent people prefer to be referred to, there is no one set way. Identity first language (i.e., autistic people, whereby the identity is stated before their personhood) is preferred for autistic people (Bosman & Thijs, 2023; Geelhand et al., 2023; Keates et al., under review; Keating et al., 2016; Kenny et al., 2016; Lei et al., 2021; Taboas et al., 2022). Similarly, some ADHDers prefer this identity-first approach too (as indicated by Huijg, 2020). Following Keates et al. (under review), it is recommended to use the most acceptable term when referring to groups of neurodivergent students, but accommodating individual preferences when speaking with or referring to a specific person. There is less academic literature to guide other support needs and disabilities that could be considered to be neurodivergent. Within the academic literature, person-first language (i.e., person with a disability) remains dominant (Ferrigon, 2019; Gernsbacher, 2017). However with a lack of literature to guide respectful preferences, asking and following students' wishes becomes even more paramount.

Individuals tend to create shortcuts including through the use of labels put upon people. This can be understood in numerous ways (e.g., Friston's (2010) Free Energy Principle; Scheff's (1974) Labelling Theory). Although labelling individuals might help us identify them, the labels used may have a negative connotation, as River describes:

'Even if they did not know I was autistic, I was weird, I was shy. Those sentiments of, "You're disorganised.' - River

A brief introduction to considering needs

Many people are less aware of their neurodivergence, as the concept is only beginning to reach lay people at the time of writing. Everyone is a part of neurodiversity, having different

needs and working in certain ways. Some of these needs or ways of working may be diagnosable. The idea of 'normal' as been argued to be a 'subjective aggregate' (Davis, 2010), echoing that normal is an idea rather than a reality (Armstrong, 2015).

In addition, not all neurodivergent students will know if they are neurodivergent or not:

'Not all students who are ND will know that they are, and not all will be willing to tell you.' - Freya

Under-recognition occurs in various social strata, including older generations (Bargiela et al., 2016; Green et al., 2019; Leedham et al., 2020) and individuals from ethnic minority backgrounds (Aylward et al., 2021; Gopaul & Little, 2020; Wiggins et al., 2020; Zuckerman et al., 2020). Furthermore, being neurodivergent may be seen as stigmatised within certain contexts or cultures (Chen, 2021; Squires & Countermine, 2018), including from ableist practices (e.g., Beratan, 2006; Bogart & Dunn, 2019; Hale, 2015). Therefore neurodivergent students may not ask for help or suppress their own needs, leading to not being able to engage in university as well as they could if needs were accommodated.

Part 2: Neurodivergent people in Higher Education

Many universities already have policies that promote good practice. However questions remain of their utility for supporting neurodivergent students to reach their full potential. As Martin (2020) indicates, opening the metaphorical (and maybe literal) door a little bit is not sufficient. As previously mentioned in Part 1, there will be neurodivergent students at all universities. When considering autistic students with a diagnosis *alone*, 2% are *autistic* (Özerk, 2016). Most figures indicate that 15% (ranging between 10 and 20% across sources) of the population are neurodivergent (Katari et al., 2023). 5 to 10% of people are dyslexic (Knight, 2018); 3 to 5% ADHDers (Song et al., 2021). Assumptions about population estimates matching those in attendance at universities remain, however this demonstrates the high number of students within universities who may be neurodivergent. Furthermore, many neurodivergent people have other co-occurring neurodivergent identities or other needs (e.g., be autistic and an ADHDer).

Certain employers found that neurodivergent workers are more productive than non-neurodivergent workers (Bury et al. 2020; Hutson & Hutson, 2023). The argument could be made that neurodivergent students are working harder and more efficiently. In light of this argument, using a strength-based approach can have benefits for both students and universities (Urbanowicz et al., 2019; White et al., 2023; Murthi et al., 2023; Lee et al., 2023). Universities can help motivate students by accommodating their needs through focusing on strengths. A strength-based approach empowers and enables students to be themselves through a non-judgemental approach. This is vitally important as the world is not built for neurodivergent people (Benson, 2023; Hillary, 2020; Huijg, 2020).

In recognising the world is not built for neurodivergent people, reasonable adjustments (Equality Act, 2010) can make changes so that disadvantages and barriers neurodivergent

people may face are removed. Universities have a legal responsibility to make reasonable adjustments in line with the Equality Act (2010). However, prejudicial attitudes and systemic barriers may mean adjustments do not remove disadvantage. The below example demonstrates the barriers a neurodivergent student may have at University:

Case studies of barriers a neurodivergent student may face at University

Autistic

First, the physical design of the space can be cavernous and consequently bad for autistic people due to the echo of sound (Bogdahina, 2003; Ghazali et al., 2018). Similarly, fluorescent lights are bad due to the lights flickering (Ghazali et al., 2019). Autistic people can see the flickering of fluorescent lights unlike non-autistic people[1]. Instead, rooms that are carpeted and have lots of natural light are better. Second, all social contact within a formal interaction at university should be predictable (Boldsen, 2022; Ochs & Solomon, 2010). An informal chat that includes important information will create issues. If the conversation contains anything important, write it down and email the information. Additionally, do not expect social norms (Sosnowy et al. 2019); they are mostly impractical, and nonsensical, anyway. Third, in regard to communication, use useful or interesting information that is specific and clear (Shillingsburg et al., 2015; Bogashina, 2022; Tomczak, 2021; Terlouw et al., 2021). Small talk is undesirable (Benson, 2023). No one really cares about 'the weather today' entirely. Lastly for this case example, mental health and well-being will be impacted by shouting, so do not raise your voice. It will never be helpful. Do not tell people off, they are adults, anyway. In general, rejection is hard for autistic people, for example, due to a history of social rejection (Acker et al., 2018); and rejection sensitivity mediating depression for autistic people (Keenan et al., 2018). There is a concept of rejection sensitive dysphoria. This actually comes from ADHD (Dodson, 2022), but it is very practical. If anyone perceives rejection it can be disheartening and difficult, but it is even harder when you are autistic. It is being recommended that these may be helpful considerations for many neurodivergent people, and not just autistic people.

ADHD

Commonly known about ADHD-ers is the activity or focus can be short, which can lead to stress of being seen as unfocused. They may experience perceived difficulty of using 'appropriate' emotion displays or adequate regulation, and over-sharing information (Rosqvist et al., 2023). Next, social factors can include the that ADHD students (and staff) may have the lowest acceptance deserving of accommodations from the higher education institution (Buchanan et al., 2010), More broadly, neurological dispositional difference may occur between social actors (i.e., interpersonal disparities based on the differing neurology)

[1] Autistic people have strengths that non-autistic people do not have, e.g., capacity to see details within the global whole (Happé & Frith, 2006). These help to understand all of what has been stated about autistic needs so far, e.g., the use of natural light over fluorescent lighting.

(i.e., Milton, 2012; Milton et al., 2023; Rosqvist et al., 2023). and by which it is meant that most if not all neurodivergent students would experience

For academics, this might extend to issues with colleagues or staff in the workplace as having overly uneven knowledge and abilities, and appearing too messy for academic work (Rosqvist et al., 2023).

Visual Stress

The centre of the academic experience is written text - be it on a screen or printed. However imagine as you are reading, the words moving around and certain letters blurring into each other - notably letters like 'i' and 'j', and 'm' and 'n' (Evans et al., 1996). This is the lived experience of a student who experiences visual stress (otherwise known as Meares-Irlen Syndome, or just Irlen's (Kriss & Evans, 2015).

Given many courses are 'text heavy', this will mean lots of swirling text, which ultimately leads to lots of headaches and migraines, which are common side effects. Dizziness when reading is also not uncommon (Hoppes et al., 2019). Individuals who have Irlen's may use coloured overlays to reduce the 'movement' of text (Uccula et al., 2014), however these may not alleviate all reading difficulties (Ritchie et al., 2011).

Educational institutions may not always recognise Irlen's or provide required accommodations (Young, 2021).

It is important to note that many pertinent factors are cross-neurodivergent experiences. Albeit that not every experience will be the same between nor within neurodivergent identities (i.e., neurological difference), the needs of which universities should accommodate are all crucial considerations. One reason for this is that autistic and neurodiversity-affirming scholarship has created a pathway for understanding, which happens to have begun with and focused on autistic people.

To illustrate this, neurodiversity as a concept originates from the thinking of 'autistics and cousins' advocates meeting in online space, with 'no one sole originator' behind the idea of 'neurological diversity (Dekker, 2023). Neurodiversity, in 1996 described as 'neurological diversity' was discussed as having 'potential benefits'. Originating from a comment by Xenia Grant, 'autistics and cousins' refers to autistic people and individuals who have a lot in common with autistic people's experiences, notably including what withasmoothroundstone[2] (nd) lists as social, processing and sensory traits and experiences. Some of 'cousins' listed by withasmoothroundstone (nd) including ADHD, OCD and Tourette's - identities and experiences now understood as part of neurodivergent lived experiences. Although it might

[2] This source is cited by Dekker, 2023

appear that some neurodivergence discourse is 'autism-centric', the similarities between neurodivergent experiences cannot be overlooked.

Consequences of not meeting needs

'It's really hard working with someone who knows you are disabled and neurodivergent, but seems intent on not allowing reasonable adjustments to allow me to flourish. It feels like I have to give 500% all the time, when they just turn up with 50%.' - River

The consequences of not accommodating needs come with a fair warning as the consequences can be huge. Firstly, considering burnout, this has been identified as chronic exhaustion, with a loss of skills, and reduction of tolerance for stimuli (Raymaker et al., 2020), it is clear that this would be counter-intuitive for productive academic engagement. In a study about employment for autistic people from Raymaker et al. (2023), the autistic participants shared their concern about co-occurring mental health issues from long histories of discrimination, bullying, and abuse (within and outside of the workplace). Many of the participants in the study worried about work contributing to burnout, which can mirror educational settings. Consider students working too much without adequate time to recover, or a perceptible toxic working environment, whereby students need to spend additional effort to cope. Therefore, burnout can be simplified as being freeze-like (Arnold et al., 2023; Cage & McManemy, 2022; Raymaker et al., 2020). There is also shut down, which has been described as frozen-like. With shutdown, this is completely shutting down and freezing, not being able to engage with anything (Phung et al., 2021). Autistic people may also experience meltdown, which is more fight-like (Bedrossian, 2015). There is no perceived escape from the situation, and as such this provokes a fight-like response. Usually, the autistic person will not be aware or able to recognise what is happening (Bedrossian, 2015). Many of these factors can be experienced by other neurodivergent people too. For example, many students may have experienced discrimination, bullying, and abuse. Social exclusion can be possible for many neurodivergent people, including within universities (i.e., ADHD, Rosqvist et al., 2023; Dyslexia, Gant & Hewson, 2022; Dyspraxia, Raleigh & Strauss, n.d.). These could culminate alongside university stressors with impact similar to shutdown, or meltdown; however, burnout is conceptually similar in the literature for other neurodivergent identities than autistic students (Syharat et al., 2020; Dyspraxia, Walker et al., 2020).

'If I have spent my entire lifetime demonstrating that I have learned the required information in certain ways, like writing papers or taking exams, it does not help me to all of a sudden expect me to do something entirely different just to demonstrate the same thing.' - Hal

It is important to state that all universities want students to pass, so if this is the case each university must not be the cause of any of these consequences. If these occur, the student will not be able to engage in their work. Obviously, there is no guarantee about other parts of their life resulting in negative outcomes that impinge on their academic endeavours.

Universities want inclusion, not exclusion.

At every university, it is already known that implementation of best practice is not on each individual member of staff, but the system of the university (Ballantine & Hammack, 2015). No education institution functions with individuals being solely responsible for best practice and accessibility or inclusion. In the experiences of the authors, it has always been a collective, collaborative approach, and it is always intra- and inter-department. Universities, like all other educational institutions, are a system that enables students as a unit (in order to be effective), which requires individual staff members to adopt best practice, and inclusive mindsets. Moreover, if universities are not enabling neurodivergent learners, this is a loss of potential whose talent would have otherwise been developed (Harmuth et al., 2018).

'Universities must be aware that there is an innate position of power with their staff, and that creates a sensitive relationship.' - River

Many universities will already use practices built for inclusivity for diverse students. For example, the use of immersive readers; multiple formats and digital learning strategies; use of videos to re-explain threshold concepts; lecture recordings with bookmarks and transcripts; and some use easier Virtual Learning Environments (VLE) than others (which need good practice regardless of which one). With VLEs, many can be a list of files, which is less practical for students to use and be guided through their modules properly. Even simple adjustments that structure a file list is better than no facilitation through the VLE.

Some management of universities may worry about the impact of accommodating needs, which seems to focus on the impact on staffing resources. If this is the case, it is already being exclusionary, because it is potentially ignorant of who universities already have regardless of whether they know or not. In essence, a university adopting this mentality of being worried about the impact of staffing resources due to accommodating neurodivergent learners means that they do not want these students *because* it is impacting the staffing. In other words, this means they are not able to accommodate needs and are unable to enable these learners. In brief, the hypothetical universities with this mentality are clearly not wanting these students to exist at their university because it's impacting their staffing and business.

'It's nice to see that staff in my department have genuinely been trying to make adjustments, but I think they need more support from relevant accessibility guides to show them where to look to learn more.' - Freya

In addition, the ability to ask for help is underrated. Many will not feel able to ask for help due to the felt or perceived impact of the norms of the social world, stigma, etc. Meeting students' needs is a cyclical process (e.g., Nilsson, 2014; Oliver & Oesterreich, 2013; Tyler, 2013), which can become easier with greater success with every student that has their needs met. Importantly, this requires not forgetting how needs were met when new staff take over roles. Thus, developing, learning, progressing in order to be fully inclusive is a practice constantly under development. Ultimately, this is the same as being a reflective

teacher (Brookfield, 2017; Perryman et al., 2017; Soisangwarn & Wongwanich, 2014). All teaching staff learn as they continue, and are constantly improving and developing their practice. Furthermore, this is always going to be the case because universities have different students each in-take. For example, many years ago when one of the authors worked in a school, there was a teacher that struggled with the current student base. They were not able to enjoy the job and they were not necessarily as effective as they used to be as a teacher.

A step forward with this is to normalise accessible practices in higher education. This will take time with the students in order to make the practices happen, and make it be normal for them to have these practices in existence. For example, if you have visual stress, the text in this chapter probably has required some assistance - be it through tinted glasses or a reader software package.

Ableism

Ableism values certain abilities over others that leads to discrimination against those less able (Wolbring, 2007, 2008, 2009, 2012). It is a set of beliefs, processes and practices that result in discrimination based on a person's abilities. It is preferring certain over other abilities, which results in real or perceived judgement that is used to seemingly justify prejudice (Wolbring, 2007; 2008; 2009; 2012). Dolmage (2017) identifies the experiences of disabled students and the impact of ableist systems and structures at university and colleges. One example of ableism is given below by River, in their interactions with a fellow student who did not understand the support they needed through reasonable adjustments:

'Another student once said to me "it's not fair that you get X, Y and Z" to me, and another time announced my grades to the class with "it's not fair". Yet he didn't understand how necessary reasonable adjustments were for me to be able to succeed. It felt like he wanted the female presenting disabled student to fail.' - River

Examples of ableism are not limited to people with disabilities (Wolbring, 2011). Nonetheless, an illustration of ableism for ADHDers is asking them to sit down and be still. Additionally, the following are examples of ableism related to autistic people: forcing autistic people to make eye contact; enforcing a communication style that is inaccessible or draining the energy of the autistic person; and expecting people experiencing mental ill-health to complete paperwork when they might not be even be able to get out of bed (albeit that this would be true whether neurodivergent or not). It is not a good practice either, and it is difficult to think of how to overcome bureaucratic procedures that are common practice within and across universities. However, these do need to be addressed.

'Lecturers who don't know I'm neurodivergent organise meetings but do not always outline what exactly we would discuss, so I anxiously prepare for every possible conversation, which often ends up being a waste of my time. Knowing I can ask for further details, or even better, being provided them in the first instance, has really helped' - Freya

'[Barriers for me include] strict deadlines (even with extensions), stigma and fear of asking for help(feeling behind other classmates' - David Hinge

In every university, staff must reflect on their practice (Chicken et al., 2023). There is a need to reflect on what could be experienced as ableist. Taking the time to consider this is vital to better practice, as it can guide the structure and systems of university, as well as teaching practice. As an example of teaching, some lecturers in higher education might speak quickly, which is unhelpful for various students including neurodivergent learners and students with English as a 'second' language. This clearly is ableist, but what is the solution? The lecturers can try to slow down, but if it is just their usual speed this would be difficult at which to succeed. Thus, alternative answers are required. They can use a greater extent of re-iterations, provide tasks that ensure what was said was understood, and provide videos of lectures that can be slowed down.

In an action research study by Keates (under review), the research sought to understand autistic learners' needs in a community-based learning environment. It was found that there was a need to explain concepts one way and then a different way as well. This helped to ensure the concept was understood by everyone.

Group work and presentations can be seen as ableist, with these reported as difficult by many of the participants. Therefore, these are barriers for the students and the discrimination exists in the expectations of the university staff; group work and presentations are ableist due to asking learners to perform in a neurotypical or neuromajority way and without understanding of the barriers or ability to be assessed that are possible to be completed in an alternate way, e.g., pre-recording, or an alternate assessment. To further exemplify this, assessment of students' presentations can sometimes (or often) not be about the content, but about how the student is presenting the work (see quotes below). In addition, how students work together is based on social norms and abilities based on non-autistic ways (see quote from Millicent below) - this is a preference for other abilities that results in real judgement that is used to justify prejudice. Clearly, teamwork and group work are also ableist based on this description. This is not to suggest either are not possible. The solutions are clear from above, so it is possible to accommodate everyone.

'Group projects' - Hal

'For higher education, working together or even presenting solo should never be a personality or charisma assessment. You should only assess if the student understands the topic - use a variety of techniques to assess this rather than pinning it all on a presentation or singular piece of work' - Millicent

The same can be said for seminar participation. This is exemplified by two respondents, Freya and Hal:

'Grading based off of discussion (how much is enough talking? What are we expected to say?)' - Hal

'I understand why people measure seminar participation, but I think they need to be more flexible about how they define it. Sometimes I have really intense interest in the subject, so

engagement is easy. Otherwise, it can be a huge struggle to engage, and they often expect me to hold conversations or make eye contact, which I don't always feel capable of doing. Finding some alternative way of measuring this might be more inclusive' - Freya

Therefore, alternative methods and choice are important within curriculum design. Offering the option for this approach to learning will be beneficial for some, so the key solution is choice of method and how the learning tasks can be completed.

Theory-to-practice gap

The theory-to-practice gap can be problematic in higher education. This refers to the understanding of the issue, but the practice does not match. There could be a situation whereby the needs of the university and staff can outweigh those of students. There is a need to focus on meeting the needs of students rather than meeting the needs of the university staff. Obviously, there is the dichotomy of wanting to be able to be inclusive for staff as well as students (i.e., neurodivergent staff exist too, Brown, 2021; Finesilver et al., 2020; Dwyer et al., 2023; Lewis & Arday, 2023; Mellifont, 2023), but all needs should be accommodated.

Part 3: Universal Design for Learning in Educational Practices

- The real question is how well?
- Is there a theory-to-practice gap?
- Do Higher Education Institutions enable their neurodivergent learners?

The proposed solution of Universal Design for Learning (UDL) is discussed in various publications (e.g., Behling & Tobin, 2018; Black et al., 2015; Braken & Novak, 2019). The approach is advocated for in various settings too (Dougan, 2023). This includes specifically addressing autistic needs (Milton et al., 2016). The proposed solution is not new, with many of the points stated here being delineated upon in Spaeth & Pearson (2023). Therefore, the requirement is to successfully implement and build upon pedagogical, heutagogical, and andragogical principles (Friedman & Nash-Luckenbach, 2023). As such, the above questions and what has been mentioned in the chapter already are key to why this is being expounded upon further.

To begin, there is a need to state what UDL is before explaining how it can be implemented to gain effective results. Many aspects of students and their lives influence their engagement with, and approach to, their learning that equate to their variability (Meyer et al., 2014). For example, "...a dyslexic student for whom processing and remembering information is a challenge, would engage with and approach learning in a very different way to a non-dyslexic student" (Merry, 2021). The reason for UDL is to plan for learner variability by incorporating a variety of options that allows it to be accessible and inclusive for all students with unique needs of each student, and to customisable learning experience, removing barriers from the learning environment (Meyer et al., 2014). It is positioned that UDL is a research-based framework, which is meant to result in quality teaching and learning; it is a reflection tool to examine staff's practice and a way to think about the

practice in order for a positive impact on the learning experience of all students (Smith, 2012). It is not a checklist for higher education staff to tick off in order to be seen as 'accessible', nor a box ticking diversity exercise, or a completely new task that is additional to the usual workload ("A Checklist for Making Disability Inclusion a Reality in Higher Education," 2023). UDL is meant to help universities make wise decisions and as practitioners in departments within universities (Behling & Tobin, 2018; Braken & Novak, 2019). Therefore, it is meant to be adjusting the delivery of university staff's job or programme.

For the greatest ease and exemplifying how UDL meets ND learners' needs, there are 4 themes in which links to the various domains within UDL. One set of domains (see table 2) is from The Centre for Excellence in Universal Design (CEUD). They were established by the National Disability Authority (NDA) in 2007. They have 7 domains, of which some are referred to in the themes below. The themes are: considered communication; technological assistance; be predictable and meet expectations; normalise everyone's needs (or rather, normalise neurodivergence).

Table 2. The 7 domains of UDL from Centre for Excellence in Universal Design (CEUD)

Domains	**Sub-domain**	**Sub-domain**	**Sub-domain**	**Sub-domain**	**Sub-domain**
Equitable Use	Provide the same means of use for all users: identical whenever possible; equivalent when not.	Avoid segregating or stigmatising any users.	Provisions for privacy, security, and safety should be equally available to all users.	Make the design appealing to all users.	
Flexibility in Use	Provide choice in methods of use.	Accommodate right- or left-handed access and use.	Facilitate the user's accuracy and precision.	Provide adaptability to the user's pace.	
Simple and Intuitive Use	Eliminate unnecessary complexity.	Be consistent with user expectations and intuition.	Accommodate a wide range of literacy and language skills.	Arrange information consistent with its importance.	Provide effective prompting and feedback during and

					after task completion.
Perceptible Information	Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.	Provide adequate contrast between essential information and its surroundings.	Maximise "legibility" of essential information.	Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).	Provide compatibility with a variety of techniques or devices used by people with sensory limitations.
Tolerance for Error	Arrange elements to minimise hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.	Provide warnings of hazards and errors.	Provide fail safe features.	Discourage unconscious action in tasks that require vigilance.	
Low Physical Effort	Allow users to maintain a neutral body position.	Use reasonable operating forces.	Minimise repetitive actions.	Minimise sustained physical effort.	

Size and Space for Approach and Use	Provide a clear line of sight to important elements for any seated or standing user.	Make reach to all components comfortable for any seated or standing user.	Accommodate variations in hand and grip size.	Provide adequate space for the use of assistive devices or personal assistance.

Considered Communication

'Knowing I can ask for further details, or even better, being provided them in the first instance, has really helped.' - Freya

'I am a stickler for rules and I will do exactly what you say' - River

Everyone uses communication specifically, but this is true more so when the person is neurodivergent (i.e., there are autistic communication styles). It is clear that non-autistic people struggle to understand autistic communication and socialisation and that these dispositional differences have an impact (Brewer et al., 2015; Camus et al., under review; Casaratelli et al., 2021; Cole et al., 2022; Heasman & Gillespie, 2019; Howard & Sedgewick, 2021; Rifai et al., 2022; Wood, 2020). Accounting for this is aligned with UDL practice, such as simple and intuitive use within the educational strategies, such as accommodating a wide range of literacy and language skills (see table 1; NDA, n.d.). Therefore, staff must say what they mean when communicating with autistic or the wider neurodivergent student population. When considering the presentation of information and text, there is a need for no light text on a light background. This helps by providing a strong contrast between text and background (Tomlinson & Newman, 2017). The best font is serif, and specifically comic sans, and additionally thinking about line spacing is an important consideration too (Dechka, 2021; Liebel & Sigurðardóttir, under review). This aligns with UDL in regards to having perceptible information, which is specific to providing adequate contrast between essential information and its surroundings (NDA, n.d.). Furthermore, using headers to guide students in emails, which supports students to understand the contrast between essential and

surplus information. In-line with this, autistic people need to know what is important information, so staff must be clear in their communication. Subsequently, staff must know that if the information is important, this should be concisely and clearly written down for the student to process and not verbally mentioned. This is aligned to having simple and intuitive use of information that is consistent with its importance with UDL (NDA, n.d.). Additionally, staff can embolden important text, but not everything should be in bold. This ensures perceptible information has adequate contrast between essential information and its surroundings (NDA, n.d.). This means that staff can ensure important aspects of the information are clear, such as the use of highlighting text in a usable way. As Anne identifies below, forms include a need for comprehensive communication. Therefore, the design of written communication requires consideration of neurodivergent communication styles.

'Most higher education forms (registration, ethics, health and safety, data management etc.) have been inaccessible for me. Either because they were badly designed in the first place or because people haven't understood that I need help with them' - Anne

To consider the design of presentations, staff can adopt appropriate colour design too, as generally presentations should be limited to two colour tones (i.e., shades of orange and brown). In addition, a lot of text on-screen in the presentation slides (and even in emails) will not be easy to process. This aligns to a UDL principle of having perceptible information (NDA, n.d.), within this there is a need to use different modes (pictorial, verbal, tactile) for redundant presentation of essential information (NDA, n.d.). Furthermore, staff can query whether it is clear what learners must pay attention in order to understand what is important. This matches the domain regarding tolerance for error (NDA, n.d.). For better understanding when delivering key information, the use of various methods of communicating is necessary. This will be dependent on the students' needs. In addition, video explanations can help with this, as an alternative re-iteration of threshold concepts in teaching, or important information more generally.

'Put links in the PowerPoint notes' - Jessie W

For the topic of communication, an easy summary is that staff must communicate according to students' needs; be specific, concise and clear; and can even question whether procedures are simple. Can students that have mental health issues and are not able to fill forms say so? These align to using perceptible information via differentiating elements in ways that can be described (i.e., make it easy to give instructions or directions); maximising "legibility" of essential information; and having simple and intuitive use, which need to entail eliminating unnecessary complexity (NDA, n.d.).

'Tutors who have been flexible and who have understood that I need to approach things differently have made all the difference' - Anne

'I work well in a lenient, relaxed environment that encourages work through enjoyment of the subject' - David Hinge

Technological Assistance

For technological assistance, the key question is whether students can use the learning resource for the same accurate result as others. This consideration links to having flexibility in use, and specifically facilitates the user's accuracy and precision (NDA, n.d.). An example is students being able to download content in different media from VLEs (Clouder et al., 2020). This also aligns with having equitable use for students, and more specifically making the design appealing to all users in accordance with UDL (NDA, n.d.). Learners may use an immersive reader, and the use Padlet (an online website that groups comments and threads used for written communication in the moment). Additionally, providing students with alt-text on images is crucial for inclusivity and accessibility. All images must have alt-text in any communication in case a student uses a reader to read the image. This is because all students must have access to resources that should be possible no matter the students' needs.

'Accessible screen readers are helpful. If you have any diagrams in presentations, especially in recordings, describing them can be really helpful as well. What I found personally helpful is with some of the theoretical concepts, being able to link to a multimedia. There are fantastic resources already created and online' - River

Technology helps neurodivergent learners. This theme was one of the most identified by those responding to the questions about their experiences. Having items and phones usable in sessions is an important feature. LXZ Brown at the Kennedy's Institutes conference panel discussion on disability (Belser et al., 2017) stated that they were unable to use phones in their American college due to the inaccurate belief that it was a distraction. Now they lecture and enable neurodivergent (and other) learners through the use of phones in the sessions. Unlike non-neurodivergent learners, having something to occupy one aspect of oneself enables another part to be able to be focused. Thus, autistic learners stim to cope, students with PTSD might use their phones to occupy their minds and be more able to hear the lecture, and learners can have the slides to make notes on or just to see up-close.

'Ability to have some use of my phone and/or bring things in class has helped' - David Hinge

'A blanket ban on technology makes it harder for me to concentrate' - Hal

Another important factor is that autistic and some other neurodivergent learners need the sessions recorded in order to return to them at a later date. In addition, there are practices in higher education whereby all sessions are available at the start of the academic year. This enables predictability for autistic learners (albeit that when the lecture happens, there might be some alterations made) (Beardon, 2021).

'By refusing to record your lecture, even though the equipment is there, means that if it's a low spoon say, neurodivergent students miss out' - Millicent

Be Predictable and Meet Expectations

'Basically, just set clear expectations. For example, when are office hours? When can a student drop-in to your office or desk? How do students get in contact with you? What is best? What do you expect of me in your classes?' - River

It is likely that this theme has already been noticeable. Nonetheless, universities must have practices that are easy to use, so it is recommended to simplify procedures. For UDL, this aligns with simple and intuitive use, and the elimination of unnecessary complexity (NDA, n.d.). Adjacent to this is the need for simple administrative systems. For neurodivergent students, universities should consider all aspects of navigation. This is regarding the UDL domain of tolerance for error, and more so about arranging elements of university practice and student engagement to minimize any issues students may face navigating any aspect of university education and life ('hazards and errors', NDA, n.d.). Therefore, is the guidance for the learning resource clear? Universities can provide warnings of 'hazards and errors' (NDA, n.d.).

'Clear, detailed handbooks that directly outline ways I should address the staff member. (I.e., pronouns, whether I should use their official title or just their first name, what I can ask them about, and any other such clear communication)' - Freya

'Admin information not being provided in a clear, structured format, or being spread across different platforms (email, website, blackboard, outlook, attachments etc.) has unnecessarily taken up a lot of cognitive energy' - Anne

Structure is required for neurodivergent students. Having a clear structure supports students to know when to do or use something. This aligns with equitable use for all students, and ensures the design is appealing to everyone (NDA, n.d.). A key practice regarding this is to use mandatory minimums (Hamilton & Petty, 2023), so it is clear what the expectations of the student is for each module, and activity or situation. Setting expectations and having clarity is helpful, which links back to communicating well to meet neurodivergent students' needs. This aligns with a UDL domain of flexibility in use, and specifically the facilitation of user's accuracy and precision (see table 2; NDA, n.d.). Therefore, for autistic students, consistency and predictability will help, which is about having clear expectations. This practice of being simple and intuitive with usability through being consistent with user expectations and intuition is a UDL sub-domain (see table 2; NDA, n.d.). Similarly, staff must use consistent behaviour (or students will leave and not come back to the university).

'A clear booklet explaining everything you're going to learn, the source material and where to find it. Along with essay questions and marking rubric' - Millicent

Regarding processing information, teaching staff and lecturers must keep to what is written on the slides. For autistic people, processing multiple streams of information is less possible, so if lecturers say what is not on the slide, it is more difficult (Keates, under review). In

addition, staff can provide visual cues for instructions, so students can re-visit the instruction or information to remind themselves. This aligns with a UDL domain of having perceptible information (NDA, n.d.). This can be specific to differentiating elements in ways that can be described (i.e., make it easy to give instructions or directions).

Students will thrive when they know if they are successful in a task, so staff can be positive and supportive. Furthermore, to be more helpful, staff can identify why something else is preferable, and how to do better regarding feedback on a task or activity. Therefore, universities can inform students when they are doing well, and guide them on how to improve.

'The curriculum needs to make sense, and align with the exam. The course and assessment should be designed in a way that allows a student to flourish - like questions that are clearly written' - Millicent

Similarly, universities can consider whether the digital resource is clear and easy to use. This aspect fits a UDL domain regarding tolerance for error, specifically arranging elements to minimize hazards and errors (NDA, n.d.). If the learning resource leads to mishaps in use, what could have been done to attenuate this before it happened?

It is possible to consider students' physical safety associated with predictability and a sense of security, however, it is recommended to be more concerned about psycho-emotional safety. Both of these areas align to a UDL domain of equitable use across students and the provisions for privacy, security, and safety that should be equally available to all users (NDA, n.d.). One last point for this theme must be to provide content and trigger warnings, so that students can self-select whether they can be present or not based on their self-realised capacity in the moment. This will also help to avoid complaints.

Normalise Everyone's Needs (or normalise neurodivergence)

'[There should be] freedom to process in different ways' - Anne

Fundamentally, this theme is the most crucial to implement. Universities must normalise students coming as they are. To generalise, this means accommodating without stigmatisation. This is also about equitable and flexible use, but specifically avoiding segregating or stigmatising any students (NDA, n.d.). For example, staff should enable students' stimming behaviours through staff themselves being liberated with their own (sanitary) habits (i.e., normalise stimming). For autistic people, stimming helps with coping (Charlton et al., 2021; Felepchuk, 2021; Kapp et al., 2019; Miller et al., 2021; Nolan & McBride, 2015). Accessible practices are key with normalising students' needs, by which universities should not enforce group work, or oral communication. This is not to suggest that neither of these cannot occur in higher education practices, but they must be equitable for all students. The barriers for autistic students with group work should be clear by this part of the chapter. Autistic communication and socialisation are not the 'norm', so group work will be naturally stigmatising experience and thus difficult (Clouder et al., 2022; Dwyer et al., 2023; Evans et al., 2023; Kuder et al., 2023). If autistic students have control over

their group then they understand the work and the group can work well together (i.e., self-selected), which may alleviate issues. Universities will need to provide alternatives. Inevitably, there will be cohorts of students with no appropriate group members for neurodivergent students. Similarly, oral presentations are counter intuitive for autistic learners and anxiety inducing (Knott & Taylor, 2014). They need clear and predictable occurrences, and a presentation does not accommodate this well. However, other neurodivergent students might need a live audience (Hand, 2023). In addition, this is before acknowledging the impact upon the student of being an outsider within a predominantly non-autistic world (or not neurodivergent). It is known based on the Yerkes-Dodson curvilinear model of anxiety (1908) that no university will obtain the best from their students if anxiety is too high. Universities must reduce the negative impact on students by providing alternatives to these, or facilitate them according to their needs.

The design of the course in general must support students. Students must be able to complete learning in their way, so how can universities ensure the options are available? The design can include different options in seminars or workshops, such as with how to engage in-session or with an activity. This meets the UDL domain of flexibility in use and offering choice in methods of use (NDA, n.d.). Accessing learning may mean providing adequate breaks; otherwise, students are not being provided with the same means of use of the teaching – it is not accessible. If there are restrictions to what can be provided regarding time, it might be possible to offer a recorded video after the session. However, the quality of the sound and video could be an issue and therefore not equitable across students (NDA, n.d.). Providing breaks relates to various components of the UDL domains (see table 2), such as but not limited to equitable use, and specifically providing the same means of use for all users (NDA, n.d.).

'[I work best in environments with] lighting that is natural and gentle. Comfortable chairs'. - Jessie W

'Stuffy classrooms with florescent lighting pretty much guarantee that I can't access the taught content'. - Anne

'[I can't tolerate] harsh noisy lighting.' - Jessie W

Next, universities must consider equal access, and this includes reduction of sensory information in rooms. Autistic students can require dim lights, or preferably natural light, and no fluorescent light. The strain of fluorescent lights impacts students' 'energies'. As for the UDL domain in which this fits, it provides students with equitable use, and more specifically it provides the same means of use for all users (NDA, n.d.). In short, a low arousal environment is best. Therefore, awareness of what sensory needs students have is important, such as strong smells that might be too much for some students; however, like many aspects of discussion, this is not static. It is possible to consider texture, smell, and sounds. These relate to the physical effort that students experience (NDA, n.d.). In addition,

universities can signpost and have a quiet space for autistic learners available. This may be a library, or by a river outdoors.

'Even when I am listening, it often looks like I am not listening. Sometimes allowing my body to be distracted frees up my mind to concentrate' - Hal

In any case, students learn at their pace. This may result in the students not achieving the best result per the university's belief within the available given time but rather their personal best. In accordance with UDL, universities must provide flexibility in use of their resources, and adaptability to the user's pace (NDA, n.d.). To meet needs, students need to access IT or student services according to their needs. This is flexibility in use regarding the choice in methods of use (NDA, n.d.). As a tangential point, all universities want the highest grades, but students might not have this goal.

'…use a variety of techniques to assess knowledge rather than pinning it all on a presentation or singular piece of work' - Millicent

All students must have space to practise, and the possibility to fail successfully. Universities must query whether they are enabling learning through failure. Can universities normalise failure as a learning method? Can errors be reversed? This would help students in the long-run, as they become more open to trying something new and reaching new solutions. It would assist quieter students to speak for the first time. These align to a UDL domain for tolerance for error, and helps to accomplish the fail safe feature that is successful learning (NDA, n.d.). Students can learn to fail and learn from it, or fail to learn and finish their programmes with worse results.

The question remains about how can sensory and social information be made accessible. For neurodivergent students, this is the key question. If staff disable stimming or the provision of breaks, this increases the processing load. If course design does not account for neurodivergent needs, this too will increase the load, as will inaccessible learning and assignment methods (i.e., group work and student presentations). Successful failure comes with greater understanding and less processing once concluded.

Conclusion

'I find people who are me like me, who are like triangles in square boxes, and fall through the gaps.' - River

Universities must enable learning for neurodivergent students with awareness of the context of the social world in which the learners are situated. This means addressing their needs with knowledge or understanding about why they are necessary. The main purpose to having understanding is to ensure that staff accommodate needs without diverting focus to other 'priorities' that result in exclusionary practices. It has been proposed that Universal Design for Learning (UDL) will ensure best practice. This will ensure successful pedagogical, heutagogical, and andragogical practice. In this chapter, the needs of neurodivergent

learners have been thematically reported. The themes are: considered communication; technological assistance; be predictable and meet expectations; normalise everyone's needs (or rather, normalise neurodivergence). In achieving this, it is hoped that universities will reduce the sensory and social information, and adopt learning environments conducive for autistic and other neurodivergent students.

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