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# ECOSYSTEMS SURROUNDING NEURODIVERSITY IN DESIGN EDUCATION; A CASE STUDY

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## ABSTRACT
University level design education represents a paradoxical environment in relation to neurodiversity. Current literature suggests neurominorities in the general population represent 15 - 20% with estimates in art and design education as high as 30%. Design methodology and research evolve towards care, inclusion and social innovation issues, suggesting growing awareness/sensitivity to neurodivergence. Design is also increasingly reliant on computing and new technologies, domains where neurodivergence is sometimes seen as a super-power. But many areas within design cannot yet be considered fully inclusive or supportive for the wellbeing of neurominorities in their midst. The design industry and educational institutions continue to accept a culture of competition, and of intense/irregular work patterns leading to high levels of stress and physical/psychological discomfort.
This study considers the eco-system surrounding neurodiversity in a medium sized European design school, working to improve the experience for their students. Areas for improvement are considered valuable for the whole student population. The research is based on in-depth interviews with a wide variety of stakeholders, providing different viewpoints on the experience of neurodivergent students, recognizing the need to actively involve neurodiverse actors in research related to their experience.
We consider neurodiversity (both between and within individuals) as a relevant framework and highlight specific links and paradoxes related to design education. Three eco-system related challenges are discussed reflecting the relational and environmental nature of more effective inclusion and understanding of the diversity of neurotypes in our school.

*Keywords: Neurodiversity, education ecosystems, student well-being, inclusivity, learning environment*

## 1 INTRODUCTION
Awareness of neurodiversity is growing with initiatives to promote equal opportunities and representation in the majority of institutions [1], including in higher education. In media and technology fields neurodivergent thinkers are valued [2] leading to better student support and recruitment opportunities. But this vision of a system that from the outside appears to be changing might not be matched by micro-level lived experiences of the students concerned [3]. Current figures suggest neurominorities within the population to be around 15 - 20% [4] [5] but neuro-inequalities [6] still exist. Public/educational spaces are not yet neuro-neutral [6] and disfavour neuro-minorities. In HE, less than 40% of autistic students may successfully complete their studies [4] [7] with figures difficult to establish due to non-disclosure, and/or lack of formal diagnosis at the start of studies.
University level design education is both a relevant and paradoxical environment in relation to neurodiversity and the above-mentioned need to continue to work towards a better experience for neurominorities. The context of this case study is a medium sized French design school, working to improve experiences for their neurodiverse student population, with many adjustments already established and appreciated. It should be noted that the French context [8] may generate specific issues, reportedly being behind other European countries due to historical/cultural factors and prevalent psycho-analytical theories, despite growing awareness of the neurodiversity movement [8].
This study represents the start of a wider research programme to gauge effectiveness of current initiatives, identify areas for improvement and specific research themes to be developed. Our initial aim is to better understand both the lived experience of neurodivergent students and the eco-system surrounding neurodiversity with involvement of a variety of stakeholders within the school structure.

## 2 NEURODIVERSITY

The debate around neurodiversity is continuously evolving, and researchers highlight there still lacks a single unifying theory for any of the conditions [5] commonly included in this definition: Autism, also known as autism spectrum disorder (ASD), Dyslexia, Attention-deficit/hyperactivity disorder (ADHD) and Developmental Coordination Disorder (DCD). In an area where misconceptions are still very common and have real impact on the experiences of neurodivergent students and staff - it is important to be aware of harmful narratives [10]. Neurodivergent people are neither "broken" nor "talent" [5]. Strength-based models may also be problematic [3]. Dwyer (2022) advises considering both strengths and weakness and being aware of (our own) biases [11]. The distinction between "neurotypical" and "neurodivergent" is not straightforward [1] due to the multidimensional nature of neurodiversity. These distinctions are also dynamic, due to evolving social norms, as the case of left-handed people illustrates, representing 10-15% of the global population and clearly today no longer considered "sinister" [1].

### 2.1 Definitions

The term neurodiversity was created by stakeholders in the 1990s, influenced by a social model of disability, linked to the idea of biodiversity - where diversity is considered essential for a thriving eco-system [5]. The term is generally used to cover Dyslexia and DCD (not considered health conditions), ADHD and autism (currently considered health conditions). Individuals with mental ill health conditions such as anxiety and depression (which are potentially transient) may be included as neuro-minorities [5]. Hypersensitivity shares many common conditions and may be reasonably included in a broader definition of neurodiversity [12]. In the context of this research we use a holistic definition, with the emphasis (present in the terms neurominorities and neurodiversity) on difference rather than disability or disorder.

This framework is valuable for encouraging a view of difference "between" individuals in a context of social responsibility, but neurodiversity is also "within" the brain. Neurodivergent individuals often demonstrate a spiky profile with high variability in psycho-cognitive and executive function performance [1]. Given the high hereditary rate and the fact that the cognitive functions concerned are in phylogenetically late-developping brain areas, current research suggests a possible evolutionary explanation for this neurodiversity [1]. Neurodiversity may be linked to changing environments and higher order survival functions - which are not an issue if neurodivergent individuals are part of a group, potentially giving advantages to the group/species.

### 2.2 Neurodiversity and the Design Context

There are likely to be a higher number of neurodivergent individuals in art and design [13], [14] with some estimates as high as 30% of student populations. The specific skills linked to neurodivergence; "high order cognitive functioning reliant on comprehension and creativity" [5] are highly valued in the context of Design Education (see Table 1). But equally neurodivergent students may lack skills in time management, organization and concentration. Fitzwater, 2017 [14] highlights the complexity of equitable and effective instruction increased by this high proportion of neurodiverse learners.

Design teaching involves flexible and nonlinear teaching methods which is both positive for neurodivergent students (less formal lessons and writing) [14], but very different from the high school context and potentially lacking in structure. The design teaching environment is increasingly complex and also highly competitive [15], with curricula also relying on moments of extreme stress "the crunch" in Game design, or "charettes" in design/architecture for example.

Design is also increasingly focused on user experience, therefore appropriate consideration for neurodivergent profiles shouldn't even be a subject, reflecting design's ethical dimension (Latour,2008) [16]. As a study area that attracts a neurodiverse population, design education has a responsibility but also the capacity to show, sensitize and communicate issues surrounding neurodiversity [17].

*Table 1. strengths/weaknesses of neurodivergent individuals - adapted from Doyle, 2020 highlighting skill sets valued in Design education*

| | Difficulty | Strength |
|---|---|---|
| ADHD | *Time management *Concentration, attention & self-regulation difficulties *Teamwork difficulty | *Creative thinking *Visual-spatial reasoning ability *Hyper-focus, passion and courage |

| | | |
|---|---|---|
| Autism | *Time management *Concentration and coping with more than one task *Social and communication difficulties *Need for routine | *Memory ability, and other 'specialist individual skills' including reading, drawing, music and computation *Innovative thinking and detail observation |
| Dyslexia | *Literacy, memory, organisation, communication and self-esteem *Memory, organisational skills, time-management, stress management *Workplace participation in terms of mental functions and social interactions *Cognitive functioning and social self-esteem | *Entrepreneurialism *Creativity and cognitive control *Visual reasoning *Practical skills, visual-spatial skills and story-telling ability |

# 3 METHOD

This research considers difficulties for neurodivergent individuals as a bi-directional issue [9] with relational and social aspects of their environment as central (7). The approach for this first phase of research was to ensure the lived experiences of a variety of neurodivergent students were included [3]. 13 students identifying as neurodivergent took part, recruited through the school handicap coordinator, and through word of mouth. These included two recent alumni, one final year masters student, 5 fourth year students, two second year students and one first year student. Our aim was also to collect a variety of views from other stakeholders within the school eco-system on these experiences. In-depth semi-structured interviews, allowed long exchanges (averaging 1 hour). Respecting individual preferences, three anonymous replies were completed via Googleform, and one reply was in correspondence form. In the wider eco-system, 15 supplementary interviews included: a representative of the student union, two pedagogical coordinators, two permanent department referents, two department heads, five regular part-time staff, the human resources director, and the director of an external association. All participants received information concerning the nature and aims of the study and of anonymization. The interviews were carried out over a period of 2 months.

# 4 FINDINGS

Analysis of collected materials is ongoing, reflecting that this study was carried out at the start of a wider research programme. We focus here on relational issues that implicate the whole eco-system and may exist in other design education institutions. The three issues presented below illustrate possible differences of viewpoint between neurodivergent students and other stakeholders and also differences between neurodivergent stakeholders themselves (both students and members of staff).

## 4.1 Invisibility

In France a successful comic strip book relating the experience of a young autistic woman [18] is named "La Différence Invisible". Despite improvements and despite the proven high incidence of neurodiversity within art and design education, different forms of invisibility remain a challenge. A recent graduate comments "*I was never aware of it. First of all because no one spoke about it, there must have been neuro-atypical people in our year but no one came forward*". Most student interviewees are aware of at most one or two other neurodiverse students in their class groups, but with two notable exceptions "*most of my friends are on the spectrum*", "*nearly everyone at [school name] is neurodivergent*". The two students quoted here are in the same class, suggesting class dynamics play an important role. The perception of prevalence of neurodiversity in the student population is very varied, with responses nevertheless suggesting a much lower percentage than what is statistically likely.

An invisible subject? "*It's perhaps a kind of ghost subject*"…"*I'd like people to know but I just can't talk to them about it, I don't want to be looked at strangely*" Students interviewed considered that neurodiversity related themes were not discussed, but replies highlighted heterogeneity in experience which might be attributable to different class dynamics or as suggested by many interviewees to different sections of the school attracting different profiles of student, or a progressively tolerant environment: "*the younger students seem to be more open*". Students and staff commented on the fact that it is a "*relatively new*" subject *not present a few years ago*, with some (staff) admitting learning about neurodiversity only in the last year, which may be a reflection of the specific French case [8].

Invisible judgement is also an issue, echoing findings [9] that neurotypical peers may judge autistic people within seconds and be reluctant to engage in social interactions with them "*People tended to choose me as a last resort*" "*they said I was different*". Vincent (2025) [19] discusses how autistic

students may apply negative stereotypes to themselves, internalising stigma and negatively framing their neurocognitive distinction leading possibly to masking their differences and undermining their authentic identity.

Kai Syng Tan [13] suggests that neurodiversity is a hidden resource in HE. Our findings clearly reflect the invisibility of neurodivergent staff, which could have value for improving student experience [20]. Interviewed staff were not officially aware of neurodivergent colleagues, while considering their presence likely. Neurotypical staff are unlikely to fit the stereotypical depictions people may have of autistic people (or those with ADHD) [17]. However, of the eight members of teaching staff interviewed, 5 identify as neurodivergent, three of whom are diagnosed, suggesting the actual percentage of neurodivergent staff may be considerable. The student cohort had differing views on neurodivergence among the staff, with some detecting a potentially large number among part time tutors "*yes, clearly [laughing] you can feel it, autistic, attention disorder, there's not much doubt…teachers who can't stop talking, jump from one subject to another*…". The hidden value was reiterated by students; *Yes their experience would be really useful, to know how they managed - could reassure people*". Echoing findings [20] on the possible added value of dyslexic teachers (with greater somatic sensitivity) staff identifying as neurodivergent commented on their ability to read the faces of students, see gazes drifting, spot more easily students in difficulty, and particularly those with sensory or attention issues. The director of a local association supporting employment for autistic people highlighted how autistic teachers can be very effective with students (but less with their hierarchy). Equally, learning, teaching and researching [13] may be strengths of this population. An inclusive staff cohort [4] may give better understanding of neurodivergent students, facilitating better adapted adjustments for their needs.

### 4.2 Sandbox, Ongoing learning

"*What I learn at school - I learn to adapt myself*", "*School is a good setting to test things out, to find stability, a good sandbox*" These quotes, from two different students in their 4th year of study, highlight the obvious; school is a place for learning. But in the case of neurodivergent students school can and should be a "sandbox", where students can safely and progressively evolve. A student diagnosed at the end of her third year describes a recurring pattern: "*I compensated enormously. I did far more sleepless nights [working] than my classmates. I had to redo the lessons. The first year I don't know how I passed. The second year I saw that I had to do something…The more you understand, the more you can adapt and find solutions. I grew at the same time. ADHD is not at all an obstacle to learning.*"

The first and second years are highlighted by many students as difficult "*the first year was very complicated for me - my work was nolonger the same and I had to organise myself alone*". The experience of this student was compounded by the distance from her family, and the very different nature of study compared to high school, a problem signaled by a number of students.

A growing proportion of autistic people, especially women, go through the diagnosis process in adulthood, and thus make sense of their new identity during HE [19]. A student (autistic, with ADHD) diagnosed at the end of high school commented she is still "*trying to understand herself*" in her 4th year of study. The usual time between first contact and diagnosis is 1 to 3 years in France [8], with a lack of trained clinicians, leading to patients having difficulty finding psychologists without "outdated ideas" – echoed by participants in our survey. A rollercoaster of alternating emotions following diagnosis [8] is reflected in our research. The period following diagnosis generates a mental shift [5] at identity level which can lead to feelings of disempowerment, but can, more positively, lead to understanding one's strengths/weaknesses. Our findings suggest students are often managing recent or ongoing diagnosis, and need to come to terms with personal experiences, health concerns and fear of stigmatization [4]

Syng Tan [13], diagnosed after her PhD, comments she is still learning "how it impacts her work, how others (mis)understand it and how I can communicate it". Damiani [17] writes how he has "learnt to control the flow of his [autism] and to recognize patterns that are better for me" in adulthood. A diagnosed staff member comments "*I organise my life at work around what I can and can't do*"

Design school is an environment for discovery of neurodiversity in our cohort: "*I didn't know ADHD existed. I met a lot of people here - that's how I knew about ADHD*". And in another section of the school "*there are a lot of exchanges between people - people discover…[I learnt through] my ex-girlfriend of the time…for a long time I didn't know what it was*". Multiple references in the literature point to the value of neuro-affirming and positive affiliative relationships [19], [20]. But it is important to highlight that this discussion is not happening across all sections of the school. Our research so far shows that the 5 year study period, and it's design specializations, represent an environment with

responsibility, accompanying an important period of sense-making, particularly for neurodiverse students. Findings suggest students tend to play down their needs, verbatim from four different students: "*I don't know if the school can do more*", "*I don't have so many needs - it's more up to me to adapt*", "*I couldn't ask for more…I've got the minimum I needed*", "*I don't know if it is the responsibility of the school*". Equally we should keep in mind the high drop-out rate signaled in research [4], [21] and alluded to in our interviews.

Part of this accompaniment involves the transition to a career at the end of studies. A number of students mentioned tutors reacting negatively to accommodations/adjustments such as filming/recording parts of classes, but as one student stated the "*school mentality [is] to prepare for the professional world [but] my brain will be developed and I will have found the solutions*". While there is evidence of growing acceptance and interest in employing more neurodiverse students [2], this is also an unknown and source of anxiety for many neurodiverse students representing an area where the value of neurodiverse staff could bring value.

### 4.3 Confidence/System

Many reactions from stakeholders in our study paint a very positive picture. A member of coordinating staff highlighted that although the numbers of neurodivergent students is very different today from when she joined the school eight years ago, the problems don't come from these students, and she estimates that perhaps only 10% to 15% keep their diagnosis to themselves. A part time tutor familiar with the subject teaching both in our school and elsewhere noticed a positive difference in the school, with individualized accompaniment for all students. Almost all students positively mentioned the nurse/handicap coordinator and many their department referent as being part of their support system. Equally a diagnosed member of staff related feeling comfortable in the school compared to other teaching establishments due to the understanding atmosphere, and support given to students. A student commented that the school was "serious" compared to equivalent establishments. Mutual aid and positive atmosphere were mentioned by around half of the student cohort.

Nevertheless confidence is a key issue. The only people mentioning super-powers were two (neurodivergent) staff members. Lui et al [15] report issues of lower self confidence and self-efficacy. Students in our study commented having "*self-trust issues*" and the importance of confidence. An issue where this confidence still appears fragile relates to their view of the system. "*There isn't a method at school, there isn't a system*", "*I don't know what has been put in place*". Equally many students don't appear confident that tutors are aware of their specific cases "*they don't remember*", "*I don't think the teachers know*". A number of students also mentioned that the attention and consideration received was not equitable "*the school should treat everyone the same - they listened to me*", "*I feel pretty lucky, I'm not sure if others were*", "*unequal - if you get on well with the peda(gogical team)*"

Despite the evident progress and many adjustments put in place for a large number of students, continuing to work towards (and not assuming) a climate of confidence for the students concerned remains essential.

## 5 DISCUSSION/ CONCLUSION

Two limitations in our study concern the self-selection of student participants and an over representation of older students - which while illustrating the sense-making/evolutive nature of student experience (mentioned above) indicates future research (and support) should also focus on experiences of students in their first and second years of study.

The three issues/relational challenges illustrate the diversity of experiences, and need for ongoing sensitizing with a need for more and better communication even in the design education context. Even in this context backlash and negative reactions may be an issue. One neurodivergent participant commented "*[they say] "they're all autistic now" - it feels defensive - if they only stopped demonizing - some feel aggressed by the diversity of the student body*"

Amongst our findings, issues surrounding external, part-time tutors in design education represent a key action area. These teaching staff bring appreciated direct input from the design industry and could be valuable for diversity representation, but also have very different levels of sensitivity to, and knowledge of neurodiversity, affecting student learning experiences and well-being.

The complexity and the diversity of experiences necessitate the involvement of the people concerned, both students and members of staff. These initial insights highlight action areas, while emphasizing the relational nature of valuing (neuro)diversity, taking the evolutionary view that strengths and specialized

skill sets (spiky profiles) contribute to the whole, when the whole is supportive and sensitive to individual differences.

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