



Neurodiversity and the Accessible University: Exploring Organizational Barriers, Access Labor and Opportunities for Change

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The access needs of neurodivergent individuals in organizational settings are many and varied – and so are their everyday contributions to the creation of collective access. In this study, we contribute to the growing body of CSCW research on accessibility and investigate the invisible access labor of neurodivergent students in three computer science institutions. We use an exploratory, multi-stakeholder approach, combining semi-structured interviews (n=26) and document analysis. We adopted a broad definition of neurodiversity: our study included individuals with autism, dyslexia, ADHD, cyclothymia and individuals with neurological conditions that developed as a result of illness, trauma or injury. Our findings show that neurodivergent students face a number of structural and attitudinal barriers to access in the educational environment and within the disability support system. We identified barriers in three main areas: (i) assistive technology access barriers, (ii) cognitive and physical access barriers, and (iii) social access barriers. We examined how stigma, individualized understandings of disability and intersectional disadvantage shape organizational practices and explored how students are creatively improving collective access through micro-interventions, although these efforts are largely invisible. We then draw on our findings to identify opportunities for change. We propose access grafting as a bottom-up approach to rethinking and reorienting organizational strategies to improve equitable access.

CCS Concepts: • **Human-centered computing** → **Empirical studies in accessibility**; *Accessibility*.

Additional Key Words and Phrases: Neurodiversity; accessibility; intersectionality; access labor; equity; norm-critical.

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1 INTRODUCTION

Accessibility work is cooperative and shaped by situated organizational practices, policies, implicit social values and norms. HCI research on accessibility has been increasingly focused on the sociocultural dimensions that enable or restrain equal access to resources, services and activities [11],[41],[70]. This strand of research maintains that disability is relational, and it is

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always produced through interactions between individuals and complex sociomaterial contexts. These studies uncover new possibilities for design by building on work by disability scholars and critical access scholars [35],[43] framing accessibility as collaboration across multiple actors, and stressing how special accommodations should always be studied in concert with socio-technical considerations [7]. As these studies document, the work of creating equal access in organizations has historically been made possible by the often-invisible labor and advocacy of many people with disabilities¹. CSCW as a discipline has been instrumental in unraveling the politics and implications of invisible work [60],[61],[76],[77]. However, accessibility and the invisible work behind it have received only limited attention in CSCW literature so far [55],[63],[87],[88].

This paper focuses on neurodiversity, a topic that is relatively less explored in relation to accessibility. A recent review of HCI research shows that many accessibility studies to date have focused on the experience of blind and low-vision people, followed by people with motor impairment and deaf and hard-of-hearing communities [48]. Neurodiversity, cognition-related disabilities, psychological conditions, and/or multiple disabilities are less well-represented (ibid), thus additional work is needed because these conditions are prominent in our society. The intersection of accessibility and neurodiversity has been researched in CSCW and HCI in relation to barriers in the workplace [22],[59],[88],[92], children and youth [19],[27],[29],[33],[74],[75], and higher education in general [1],[14],[28],[82].

Here, we focus specifically on access labor – the practices of negotiating and seeking equitable access to organizational services, technologies, and resources – as it is experienced by neurodivergent undergraduate students in Computer Science (CS), a relatively understudied topic which is of great importance: Computer science (CS) education still grapples with remarkable issues around lack of equity and inclusivity [10],[17],[18],[52] – not least when it comes to centering accessibility both in organizational practices and in the curriculum [6]. Our study is motivated by a wish to support computer science institutions in becoming more open to bottom-up, norm-critical ways of organizing and rethinking accessibility – by highlighting both barriers and emerging opportunities for change.

The research questions (RQs) guiding our study are:

RQ1: What are the main barriers to access experienced by neurodivergent students in CS?

RQ2: How can we re-orient cooperative organizational practices to better support equal access?

Applying a multi-stakeholder approach, we conducted a qualitative study featuring both document analysis and in-depth interviews with 18 neurodivergent students, 3 teachers, 2 tutors/mentors, and 3 disability officers across 3 Danish computer science departments in 3 different universities. We adopt the interdependence framework [7], which emphasizes collaborative access and establishes neurodivergent people as both *contributors and recipients of access, support and community-building*. Through this analytical lens, we identified not only a range of structural and interpersonal barriers but also local bottom-up *micro-interventions* through which students and their allies generate and improve collective access for the

¹ We use both person and identity first disability language, reflecting that our participants used a mix of both.

neurodivergent community at large. We give significance to collective micro-interventions as a way to reorient work practices and inspire new strategies towards inclusivity for neurominorities, considering how bottom-up knowledge and workarounds can be integrated into the current infrastructures [44],[45].

The main contributions of this paper are empirical, conceptual and practical. First, we contribute new empirical evidence on the cooperative and invisible work of access labor [11],[88] by documenting (i) the access barriers encountered by neurodivergent students and (ii) emerging micro-interventions for collective access. Second, we extend previous CSCW research by identifying access labor as complementary to articulation work in cooperative engagements, highlighting how organizational barriers require extra effort and time for neurodivergent students to participate and thrive in education. We propose **access grafting** as a collaborative approach to reorienting organizational practices: Drawing on critical access theory and disability studies [35],[43] we suggest that through access grafting, new knowledge, ideas and practices centering accessibility and disability by neurodivergent people and their allies are joined into existing organizational structures. We argue that to be able to fully develop and grow, these new branches must be supported by a strong root system. This means, in practice, building organizational readiness and confronting structural ableism through ongoing leadership and staff training on disability, neurodiversity and accessibility, ensuring financial backing for initiatives, prioritizing effective cross-functional stakeholder collaboration, and introducing policy changes.

2 BACKGROUND

2.1 Understanding neurodiversity: cognitive, sensory and social differences

Neurodiversity is an umbrella concept coined by sociologist Judy Singer to destigmatize “atypical” neurobiological structures and celebrate human variation in how nervous systems interact with the world [71]. The experience of neurodivergent folks is shaped by multilayered needs - not only in relation to sensory, cognitive, and physical differences but also to their diverse and intersecting embodied social identities and emotional needs. We frame neurodiversity holistically, covering its physical/cognitive characteristics but also highlighting how intersectional factors like mental health, gender, immigrant status, sexual orientation, ethnicity - and more - shape how neurodivergent individuals interact with socio-technical systems, intensifying some of the access barriers. We also adopt an expansive definition of neurodiversity. While many studies on neurodiversity tend to be limited to autism, ADHD, dyslexia and dyspraxia, we include the overlooked perspective of people with *acquired neurodivergence* – neurological conditions that develop as part of illness, trauma or injury, such as fibromyalgia, post-concussion syndrome or complex trauma.

While no two neurodivergent people are alike, there are areas in which their skills and needs tend to differ from their neurotypical counterparts.

- There are significant differences in ‘*executive functioning*’, a term that includes working memory, skills related to planning, initiating, and following through actions, inhibition, self-motivation, and focus [62],[72].
- *Fluctuations in energy levels* related to fatigue and physical symptoms – and often compounded by external stressors, is another area in which the needs of neurodivergent individuals differ significantly, as they might experience periods (hours, days, or weeks) in which they grapple with physical, emotional, or mental

fatigue [16],[36],[66]. A person with fibromyalgia, a neurological condition, might experience constant or frequent pain accompanied by fatigue [83].

- *Sensory sensitivity differences* manifest in different degrees of hypersensitivity or hyposensitivity - people with autism, ADHD, chronic illness, and brain injury, for example, might experience this around touch, smell, taste, sound, sight, proprioception (body awareness), or balance [20],[38],[89].
- The ability of *processing information* can also vary. People with dyslexia often use assistive technology in order to read or write text (or both) [51],[54].
- Needs around *communication and social interaction* also present differences [26],[58].
- Periodically grappling with *mental health* conditions was a common denominator for all the students interviewed. Neurodivergent individuals are more likely to have concurrent anxiety and depression, which in turn further affect their cognitive skills and energy levels [58].

We apply an intersectional approach to neurodiversity [50] as neurodivergent identities always intersect with and are shaped by other social dimensions such as gender and sexual orientation [90],[40], ethnicity [4],[69] and socio-economic status [46] - among others - which translate into different diagnostic patterns, differential access to mental health care, differences in existing networks of care and support, and increased likelihood for some social groups to incur in mental health conditions.

2.2 The structural and legislative context: the accessibility landscape in Denmark

Our empirical material has been collected in three universities in Denmark. All higher education in Denmark is free and provided as a public service, and the extensive public system of disability support – in Danish SPS (Special Pedagogical Support) - is free and accessible upon proof of disability, integrated yet separated within higher education institutions. In this section, we briefly contextualize the accessibility landscape in Denmark.

Denmark ratified the UN Convention on the Rights of Persons with Disabilities in 2009. The convention maps and details essential actions to be pursued in relation to, among others, disability awareness-raising, anti-discrimination, and accessibility – which is broadly defined as “access on an equal basis with others to the physical environment, to transportation, to information and communications, including information and communications technology and systems, and to other facilities and services open or provided to the public” [93]. But according to a recent report from the Disabled People’s Organizations Denmark (DPOP), there is still no national comprehensive plan to make these commitments more concrete [23]. The lack of extensive strategic regulations results in several accessibility gaps in many sectors, as well as cases of discrimination. Contrary to recommendations from the UN Committee on the Rights of Persons with Disabilities, Denmark also still has no strategy for the collection, analysis and dissemination of data on disability (ibid).

In Danish higher education institutions access is typically framed in form of accommodations - which also include assistive technology. But this is not enough to ensure that the needs of students are met. According to a 2021 nationwide survey, students with disabilities are less likely to start and finish educational programs [85]. They experience challenges with missing support, lack of flexibility, heavy and repeated bureaucratic tasks in the process of applying for accommodations, extensions and assistive tech [78]. The share of higher ed students registered with disability support services has increased from 3% in 2010 to 11% in 2020, but a recent governmental report raises concerns about inequitable outcomes: Students with disabilities experience lower well-being, more discrimination /harassment compared with their non-

disabled counterparts, and they interact with study environments that are not designed to be accessible – resulting in multiple barriers [81].

3 RELATED WORK

We situate our research in CSCW/HCI, crip theory and critical access studies. Below we describe previous work about the socio-political and organizational dimensions of access; the intersectional and situated aspects of access in academia; emerging from research on neurodiversity and accessibility in higher education.

3.1 The socio-political aspects of access and interdependence

We align our work with the political/relational model of disability developed by queer and feminist crip theorist Alison Kafer [43]. Moving away from an “individual model” (or medical model) of disability defined as a personal problem affecting individual people, we understand disability as a “*potential site for collective reimagining*” (ibid p.9). Reimagining social and material contexts is essential, as access barriers are always rooted in existing socio-technical systems and can only be transformed with collective efforts. Applied to CSCW, the political/relational model of disability prompts us to interrogate the values and assumptions encoded in socio-technical systems, while centering the agency and knowledge of people with disabilities in envisioning new cooperative practices. Crip techno-scientist Aimi Hamraie stresses how the making and design of environments and artifacts always reflect complex politics of knowing, and introduced the hyphenated concept *knowing-making* to indicate the practices by which disabled people transfer *access-knowledge*, reshape and share spaces, create mutual aid networks, and experiment with technology – centering their expertise about their bodies and their environments [[35]]. Using access-knowledge as a theoretical lens, we also explore how students work for collective access based on their expertise and lived experience, rather than only focusing on individual workarounds to barriers.

Crip theory has informed new ways of understanding accessibility in HCI: the interdependence framework by Bennet et al. [7] emphasizes the collaborative aspect of accessibility rather than centering the technical - focusing on how “*myriad people and devices come together to build access*” (ibid p. 169) – and stressing the contribution of people with disabilities as co-creators of access. Interdependence foregrounds how barriers are rooted in contexts that are not actively supporting cooperation, communication, and professional development around access needs, and where disability is ranked lower [7]. Previous CSCW research drawing on interdependence has examined the collaborative work of accessibility in practice [84]. This study contributes to this growing and relatively small body of research.

3.2 Organizational and intersectional aspects of access in academia

To understand access barriers and access labor in the academic context, we draw on previous scholarship in this area. Disability theory and queer theory analyses on inclusivity in academic settings have illustrated that the mechanisms of exclusions are intersectional: forms of social stratification and social oppression are always interwoven and intensify barriers [2],[3],[24]. Metaphors of flows are recurrent in conceptualizing how these mechanisms are produced and reproduced: Both Sara Ahmed and Jay Dolmage’s work analyzes how the flow and circulation of discourse, and the ways knowledge around inclusivity and disability gets stuck in institutions, become central in how inaccessibility is reproduced – voluntarily or not - in the academy [2],[24]. Ahmed refers to diversity practitioners in universities as *institutional plumbers*, whose

main work is to get things unstuck. Dolmage conceptualizes universities as *rhetorical spaces* that enact exclusionary practices, particularly in regards to individuals with non-normative cognitive abilities: The expression “higher education” itself encourages and reinforces an ethos of valuing ability, perfection, and contributes to the stigmatization of intellectual or physical weakness, where cognitive disabilities are often ranked lower than physical - students are “faking it” or are seeking extra attention by demanding their needs to be met [24]. Tanya Titchkosky’s work on the *bureaucratic making of disability* examines the role of social welfare systems in framing disability as individual function inability managed through bureaucratic practice [80]. By mapping out the unnoticed mechanisms through which universities reproduce disability as an individual problem, she invites us to consider how *lack of access becomes naturalized and made invisible* [79].

The availability of accommodations in higher education is not a guarantee for equal access. Research in accessibility in computing education has highlighted the existence of *access differential* (between students with and without disability) and *inequitable access*, indicating variability in how needs are met by existing accommodations and through considerable access labor, which often means students must find ad-hoc solutions themselves [70] and develop alternative workflows to create access [42]. Students with disabilities have long had an active role reshaping their educational environments - Berkeley’s based Cowell students famously subverted hierarchies of professional expertise creating the Center for Independent Living in 1972, putting disabled people in the role of service providers [35]. Lastly, the concept of *access intimacy* by disability activist Mia Mingus refers to the “hard to describe feeling when someone else ‘gets’ your access needs” [56] creating closeness and safety, facilitating emotional connection and making it easier to ask for support and help. Applied to CSCW, this concept allows us to center emotional safety, intimacy and trust in cooperative organizational practices for equal access.

3.3 Accessibility and neurodiversity

A systematic review of research on neurodivergent students in higher education reveals that studies typically focus on dyslexia, autism or ADHD and have been conducted mainly in English-speaking countries [20]. The review shows that many higher ed institutions “*appear to be neurodiversity ‘cold spots’ despite the existence of support services; the dislocation maintained by low levels of staff awareness, ambivalence and inflexible teaching and assessment approaches*” (ibid p.22). This research shows that barriers are organizational and structural as well as attitudinal. One example is *multimodal inhospitality*, which “occurs when the design and production of multimodal texts and environments persistently ignore access except as a retrofit” is a concept that invites us to analyze how exclusionary norms and assumptions might be carried on through interaction in the classroom and in various services [91].

CSCW research on dyslexia suggests that understanding and supporting the invisible labor of access is a necessary pre-condition for improving accessibility [88]. We extend this research by providing empirical evidence from a geographical area that is typically less in focus and by broadening our focus to neurodivergent identities that are usually not examined. To account for the fact that many neurodivergent individuals identify as chronically ill, and neurodivergent identities have overlapping characteristics with chronic illness (such as variation in ability and energy fluctuation) we build upon recent HCI work by Mack et al. on chronic illness and accessibility. Their work creates a helpful framework to (i) move beyond medical needs by

centering access needs and individual agency; (ii) center fluctuations and variability of ability and (iii) consider both sociopolitical barriers and the reality of physiological impairments together [47].

There have been different approaches to accessible practices in higher education. Universal Design for Learning (UDL) and the use of technology for planning, reading, writing, communicating, and collaborating prove hugely beneficial in promoting inclusivity [20],[30]. However, for such efforts to unfold and be effective, institutions need to both increase know-how and awareness around these approaches and be ready for organizational change.

4 METHOD

4.1 Data collection and participants: a multi-stakeholder approach

This study was framed by an exploratory qualitative research approach, combining semi-structured interviews (n=26) and document analysis, for instance of policy documents related to disability support.

4.1.1. Semi-structured interviews

We used a multi-stakeholder approach, interviewing 18 neurodivergent students enrolled in Computer Science BS or MS programs at three Danish universities (see Table 1 for details) and 8 university employees: 3 administrative officers (disability office and counselling) at two Danish universities; 2 student tutors in Computer Science; and 3 teachers working in three different Danish computer science department, with at least a decade of teaching experience in CS (see Table 2 for details). Note that individual demographics are not reported to protect our participants' identities. In the Results section, we refer to the three computer science departments as University A, University B and University C.

We recruited student participants through university social media platforms and with the help of university disability service officers. We adopted an expansive definition of neurodiversity: our study included students with autism, dyslexia, ADHD, a combination of autism/ADHD and autism/ADHD/dyslexia, cyclothymia and students whose neurodiversity was produced by illness or experiences resulting in neurological conditions, such as students with CPTSD (Complex Post-Traumatic Stress Disorder), chronic illness (fibromyalgia) and Persistent Post Concussion Syndrome (see Table 1 below). All our neurodivergent student participants had formal diagnoses.

All interviews were conducted and analyzed by the first author. Interviews took place either in person or online, according to the personal preference of our research participants, and they were recorded with a digital audio recorder. Interviews' duration ranged from 40 minutes to 1 hour and 40 minutes, with an average length of 60 minutes. We used four different semi-structured interview guides: one specifically designed for neurodivergent students, one for teachers, one for disability officers, and one for tutors/mentors, in order to gain insights on the experience and perspective of each group in relation to neurodiversity, access barriers and current access practices. Interviews with students were inspired by the life story interview (LSI) approach [5], focusing on a holistic understanding of their trajectory as students of computer science (from their choice of the study program to their future career goals) and the history of their diagnostic process.

Table 1 Aggregated Participant Role and Information: Neurodivergent Students

Education type	Self-reported disability identity		Gender	Ethnicity			
Bachelor program	14	Autism	3	Women	9	White	16
Master program	4	Dyslexia	4	Men	9	BIPOC	2
		ADHD	4				
		Autism and ADHD	2				
		Autism, ADHD and Dyslexia	1				
		Fibromyalgia	1				
		Cyclothymia	1				
		PCS ²	1				
		CPTSD ³	1				

Table 2 Aggregated Participant Role and Information: University Staff

Role	Gender		Ethnicity		
Disability officer	3	Women	5	White	8
CS teacher	3	Men	3	BIPOC	0
Student tutor	1				
Disability student-mentor	1				

Students' interviews protocols included questions on their everyday study and social experience and on their interaction with disability support systems. Interviews with teachers, disability support officers and mentor/tutors covered their professional trajectory in their role, their expertise and work with neurodiversity and accessibility (if any), and questions on how they supported neurodivergent students. They further included questions on their perspective on neurodiversity and access in Danish higher education.

Student interviewees were offered compensation for their participation in the study, whereas employees did not receive any compensation, with the exception of the student employees. We strived to focus on accessibility when planning and conducting the interviews [49], by providing clear communication in advance, reminding our participants that they could ask for breaks anytime. We let the participants decide whether they would like to prolong or shorten the interview according to their needs (the planned time was 45 minutes) and they could decide whether they preferred remote interaction or in-person interaction.

All our study participants with dyslexia, one participant with ADHD and one participant with post-concussion syndrome are users of assistive technology. The ATs most commonly used by participants are: screen reader systems, Automatic Speech Recognition (ASR, a speech-to-text technology), Optical Character Recognition (OCR), Emacspeaks, spellcheckers, audio recorder, *software for eye protection*, the Danish library of accessible digital books (*NOTA*), blue light filter and eye protection software. Even though dyslexia is the most commonly registered "impairment" by disability offices in Danish universities, we found significant challenges precisely around the AT needs of students with dyslexia.

² PCS: Persistent post-concussion syndrome.

³ CPTSD: Complex post-traumatic stress disorder.

4.1.2. Documents

This paper also draws on the study of documents and reports, particularly national policy documents on disability support in higher education and documentation of disability services offered by the national systems. Some of these documents were shared by the disability officers. Insights from these materials have inspired us to critically interrogate the current practices around accessibility in the Danish higher education system.

4.2 Data Analysis

We analyzed data using thematic analysis [12],[13] an iterative technique for generating codes, themes and memos from qualitative data. Thematic analysis is a method for the systematic identification of themes (patterns of meaning) in a given dataset, in order to make sense of shared experiences and meanings [13]. This approach is very well suited to uncover behavioral regularities expressed as patterns. Following Miles and Huberman's [57] our analytical approach involved a combination of inductive and deductive (or concept driven) coding. We started with some themes derived from the literature (our conceptual framework) while simultaneously letting new themes "emerge" from the document and interview transcripts. Some examples of conceptual categorization based on the literature, which informed our analytical process, are 'access partners' or 'crip time' (the latter was used as a deductive code, see below).

All interviews transcripts, notes and the policy documents were coded by the first author using the MaxQDA software, using a combination of inductive and deductive coding. We analyzed most disability policy documents and national reports in the first phase of the research process, to be better able to formulate the interview guides. During the exploratory phase of the analysis, the first author created 39 unique codes to summarize the data (e.g., accessibility breakdowns during exams, 'crip time' and pace of education, cultural assumptions on autism), with some sets of sub-codes (e.g. "space and use of AT" under "accessibility breakdowns during exams"). The codes were shared with co-authors for critical discussion and reflection, and finally organized in a set of recurrent "accessibility barriers" in three main thematic areas, as well as local micro-interventions.

5 RESULTS

Our results are organized into three sections. First, we describe how neurodivergent students encounter structural and attitudinal barriers to access, both in the *educational environment* and when interacting with the *disability support system*. This results in additional time and effort required for students to access academic opportunities and make use of existing support services. We have identified three main areas where students' needs are typically invisible and therefore not met: (i) *Assistive Technology Needs*; (ii) *Cognitive/Physical Access Needs* and (iii) *Social Access Needs*. These needs are rendered invisible due to a general lack of awareness and strategic focus on accessibility in the classroom, and to widespread gaps in organizational knowledge creation, organization and sharing in relation to neurodiversity and accessibility. Disability support services are geared towards students only and do not provide support for teachers, TAs or other university staff in need of support or advice around implementing accessible practices. Information on the number and typology of students with disabilities is siloed (available only within disability support units at each university) and it is not currently shared with staff in CS departments. This is due to the disability officers' concerns with sharing

information about ‘special categories’ of personal data under GDPR regulations, like disability status. In addition, disability support datasets do not include students who do not have a formal diagnosis/medical documentation, or who are unaware of or unwilling to register for disability support.

Secondly, we found that structural and attitudinal **access barriers are intensified by intersecting social dimensions** such as gender, nationality/immigrant status, co-occurring mental health conditions and multiple diagnoses.

Finally, we describe the **bottom-up micro-interventions** for collective access developed by students and their allies.

5.1 Structural and attitudinal barriers to access

5.1.1. Invisible Assistive Technology Access Needs

Assistive technology is designed to help users perform specific functions, but it only works if students are enabled to use it – and that depends on many factors, including the organizational readiness to anticipate and support the use of AT. By interviewing teachers and disability officers, we learned that the information on disability status and specific needs which is provided by students to Disability Services (upon registering for disability support) is unidirectional and not shared with anyone outside of the unit. CS teachers explain they are generally not informed – not even in statistical or anonymized terms - about the students’ access needs, and they receive no training or support around neurodiversity, disability or assistive technology. A teacher is typically only informed about access needs when students themselves choose to disclose the information or right before exams, when teachers receive a note about the assistive tech and reasonable accommodations they have been granted. This information gap among university staff creates barriers around AT especially for students with dyslexia – who often use AT regularly and are the largest registered group of students with disabilities. A woman with dyslexia reported that during her first programming exam, an oral assessment, she was surprised to be asked to code on a whiteboard without any spellchecker – the praxis at her department, unbeknown to her. After evaluating the exam, the teacher explained that she would have gotten a higher grade had she written faster and with fewer spelling mistakes. The student was stunned to learn that staff was completely unaware of the fact she was dyslexic – she registered her disability with the university Disability Services, and assumed the department was informed about her dyslexia and her needs.

Due to a lack of strategic training, disability literacy and information sharing, teachers might not only be unable to anticipate access needs but might say no to the use of assistive tech – even when the request is backed by other stakeholders (i.e. disability officers). Throughout her CS Bachelor, the student explained she was regularly denied the use of any digital (or analog) dictionary during exams, even though she needed the accommodation - which was recommended to her by Disability Services. She explains:

“Every time I go to an exam, I have to apply for getting this dictionary. And I only got them to approve it once in all 3 years of my Bachelor (...) It’s because the Board of Studies think I will cheat.” (Student, university A, dyslexia)

Students’ applications to the Board of Studies for extra accommodations during exams (which often include extra AT) are a routinized practice. But Board of Studies members –

typically teachers – also lack training and literacy around AT and disability and might say “no” because they suspect students of cheating or laziness. In our data, accessibility breakdowns during exams are among the most common and frequent barriers. In all cases they are related to knowledge sharing gaps or glitches, like examiners not providing the requested accessible files; exam proctors ignoring access needs; automatic timeouts shutting down digital exams long before the granted time extension; double booking of exams or exams scheduled too close and not taking into account the extra time granted to students with disabilities. These breakdowns led to students failing exams, getting low grades, or having to reschedule the assessment.

Everyday integration of AT in the CS classroom also presents challenges. Screen readers provided by the Danish disability services are not configured to read math formulas. In classes where Emacs is the recommended IDE, screen reader users are encouraged to use Emacspeak but are left alone in figuring out how, increasing the learning curve for software adoption, which adds to the task of learning how to code. Due to lack of CS domain-specific accessibility knowledge, troubleshooting and finding accessible alternatives were left to the students. Our data also show how space requirements for assistive tech were not considered and anticipated by some of the institutions. A student with dyslexia reported several months of delay in getting an exam room where he could use speech recognition systems for coding, and a very complicated and time-consuming protocol to find a separate room to do group work, a common activity in all CS classes:

“It’s quite a puzzle...I was having problems getting a room to do group work, because I have to speak to the computer. I asked at the Disability Services and she said, go to the student counselors... and the student counselors say (...) talk to the Dean of Education, and you have to ask the Disability services for a special headset. And you know, this, this will take months (...) why is it such a problem? I cannot be the first person talking to a computer!”
(Student, university B, dyslexia)

This quote is one example of a common experience among our interviewees – we found that **pathways to accommodations very often required excessive access labor on the students’ behalf.** Due to a lack of clear communication at the department level, and to a fragmented landscape of support across multiple service providers, seeking accommodations led in many cases, paradoxically, to added stress and less time available for studying.

Lastly, from our interviews with teachers and students we found that **accessibility as a subject is not yet well integrated in the CS curriculum** in any of the CS institutions we examined. Nevertheless, many of the study participants expressed interest in projects or careers related to accessibility and assistive tech, often in combination with a neurodiversity focus, as they found meaning and motivation in working in those areas

5.1.2. Invisible Cognitive and Physical Access Needs

Some access needs are more invisible than others. Our interviews reveal that needs linked to cognitive and physical differences – from differences in executive function to fatigue or fluctuation in energy – were often not properly anticipated. In one of the institutions, the webpage on “Accessibility” exclusively refers to mobility and wheelchair access to physical spaces, with no mention of other disabilities. Within Disability Support units, the neurodivergent students’ needs are mostly framed within a medicalized framework in which students are categorized according to areas of “functional impairments” (in Danish “funktionsnedsættelser”) or “special needs” and offered support with various types of extra

accommodations. But accommodations are not enough when organizational practices routinely do not anticipate and support the multilayered needs of students. As this student explains:

“(For) a lot of the so-called diversity initiatives, you need a ticket to get in, you need a diagnosis, the universities aren’t just generally inclusive. It’s like, we have a small inclusivity program that you can get in if you have the right label! (...) And there are the ones like me and like some of my friends [with autism] who are so well functioning that we usually aren’t taken seriously if we ask for accommodations, but we are not well functioning enough to not break down when trying to do what neurotypicals do. We are kind of invisible.”

(Student, university C, Autism and ADHD)

She articulates how the access needs of neurodivergent students are typically not visible from the outside, which can lead to false perceptions and judgments, and can make it difficult for students to express them.

The students’ different neurocognitive functioning and their physical needs are often hard to balance with the current tight and rigid pacing of CS classes, the general lack of multimodal forms of engagement, and the intense workload – even when accommodations are granted. Students with ADHD, dyslexia and brain injury wish for more *multimodal approaches to learning* and *remote access solutions*. All of our interviewees stated that recorded video lectures were among the most useful tools to support their learning. Video lectures allowed students to revise material, support focus by pausing and replaying, and allowed them to catch up on classes skipped due to fatigue, pain, stress, or social anxiety. A student with ADHD who speaks Danish as his second language noted that recorded video lectures are useful both for focus and language comprehension. *Video-supported learning* is still relatively underexplored in the CS organizations we studied, but many of our interviewees rely on Youtube science channels like 3Blue1Brown as more accessible paths to learning Maths and CS concepts. *Remote access and blended learning* are experienced as very helpful, but these approaches to learning were not common organizational practices in the institutions we studied.

We also found barriers in extracurricular and outreach activities. For example, one student reported opting out of the coding camp for women, a free initiative by her university to increase recruitment of diverse students in CS, because the program extended over three long days, which was not a good match with the needs related to her chronic illness. She explains:

“Is not like they do not want to accommodate us. They just don’t know how it is to be sick.”
(Student, university C, fibromyalgia)

In absence of clear guidelines for accessibility, the availability and choice of tools for a more inclusive learning experience are up to the individual teacher. As this teacher explains:

“I am teaching a programming course (...) At times the students approach me and ask for help with their, you know, the needs they have. So I know for example there is a fair share of dyslexic people. When they come to me, I feel ill-equipped to help them. But I do send them on in the system [of disability support].”

(Teacher, university B)

The teachers interviewed reported they would appreciate having a “place to turn in” to get support in better addressing or anticipating the needs of students.

Students also wish that bureaucratic systems of disability support offered multiple modalities of interaction. The students wish for a broader range of *remote and in-person* interaction modes, to better suit needs connected to *cognitive differences, variations in executive function* and *social anxiety* which are currently not taken into account.

5.1.2. Invisible Social Access Needs

Interdependence is a crucial tenet behind the design and implementation of accessible systems. But in all the institutions we examined accessibility is still largely understood as an individualized rather than collaborative concern. Access needs are currently addressed by allocating “special support” to one single individual – leaving out other relevant social dimensions like the richness of **pre-existing care networks** and the value of facilitating **social support and community building**.

The majority of our interviewees have experienced depression and/or social anxiety at different stages of their study journey, which meant that access partners such as parents or romantic partners occasionally needed to interact with the disability support system. But socio-technical systems are typically not designed so that multiple access partners can interact with services. In our study, these barriers emerged especially in connection with the system for hiring “student mentors”, currently outsourced to a private third-party welfare service organization. Mentors are students hired to support students with “functional impairments” and perform tasks like giving support in scheduling or organizing academic activities. They are discouraged from becoming too close to mentees or their families. This can result in care networks being disrupted: An autistic student described his shock and disappointment when he learned that his mentor was fired after initiating an interaction with the student’s mom (breaching the company’s protocol) even though this gesture was in the student’s best interest, due to his temporary inability to interact during a period of depression and fatigue.

We found that the system for hiring student mentors presented further challenges. Students with social anxiety and/or autism felt uncomfortable navigating the process of hiring their peers – since it is the student’s task to conduct job interviews, some of our interviewees withheld from seeking this accommodation because they felt uncomfortable and unsafe with the process. As this student diagnosed with Complex PTSD explains:

“You need to go interview people and then basically hire them yourself. How could I do that? I mean I can’t even study right now, because I’m so stressed out. So to read applications by people and then go and talk to them when I have social anxiety about strangers when I talk about things that I’m vulnerable about... So I just didn’t really get started. But I do honestly think that that would have been the best thing for me.” (Student, university C, Complex PTSD)

The vulnerable and intimate process of verbalizing emotionally distressing or sensitive information to untrained peers created barriers for students, who opted out of this system of support. We found that trauma-informed approaches are not commonplace but could be highly beneficial in the training of peer-mentors and in the design of peer-mentoring systems, breaking down barriers and facilitating effective and safe networks. A trauma-informed approach integrates knowledge about trauma into organizational practices and policies, centering trust, safety, choice, collaboration and empowerment [37] – when systems of care are informed by trauma, people using services have an active voice in deciding how they will receive the services. Many students stressed that social stigma and lack of literacy around neurodiversity

and mental health are significant barriers to social belonging and to mobilizing support (see examples in Table 3).

Table 3 Examples of Access Barriers

Assistive Technology Access Barriers

1. Teachers are unable to support or anticipate assistive tech needs if not routinely informed of students' access needs.
 2. Board of Studies can deny the use of AT during exams.
 3. Examiners and exams proctors forget to bring accessible exam files for screen readers users.
 4. Automatic timeouts shut down digital exams before time extension.
 5. Screen readers provided by disability services are not domain-specific.
 6. Space requirements for the use of AT during group work and exams are not anticipated.
 7. Hard to find domain-specific support for accessible software.
 8. Repeated and time-consuming tasks require considerable access labor.
 9. Delays in delivery of accommodations and AT.
-

Cognitive and Physical Accessibility Barriers

1. Staff and teachers are unable to properly address students' needs when they lack literacy on neurodiversity and cognitive accessibility.
 2. Teachers lack support on how to implement accessible practices.
 3. Intense workload and rigid pacing of CS classes are hard to reconcile with fluctuations in energy.
 4. Remote access and recording of lessons often not available.
 5. Lack of multimodal approaches in the classroom and in the bureaucratic system of support.
 6. Outreach and extracurricular activities not designed with neurodiversity access needs.
 7. Lack of flexibility in providing both accessible remote access and in-person meetings.
 8. Excessive access labor in seeking accommodations adds stress and takes time from studying.
-

Social Accessibility Barriers

1. Access partners are not enabled to interact with some disability services.
 2. Unstructured or unpredictable schedules and programs (in teaching and social events presentation).
 3. Length and pacing of social and outreach events hard to reconcile with fluctuations in energy and multiple disabilities.
 4. Stigma around disability makes it hard for some to disclose their needs (and their diagnosis).
 5. Experiences with direct discrimination in and outside the university.
 6. Stigma around mental health.
-

Many neurodivergent students have encountered negative and prejudiced attitudes at the university, in their previous studies, while interacting with social workers, and in job interviews – students with dyslexia, ADHD and autism in particular. Awareness of social stigma plays a

big role in how comfortable the students are in seeking support or stating their needs - disclosing one's diagnosis does not always feel safe. Some interviewees reported lying about the fact that they had support teachers or made sure to "hide" when they met with them, for fear of appearing "stupid". The current medical terminology adopted by systems of disability support ("functional impairment") is perceived by some as stigmatizing and stressing a deficit in the individual, which makes it less appealing to seek support.

5.2 Intersecting social dimensions intensify barriers to access and access labor

The intersection of neurodiversity with other dimensions like gender, nationality/immigrant status, socio-economic status, co-occurrence with mental health conditions and/or other diagnoses intensified existing barriers and required additional access labor from students.

Gender impacts the likelihood of being underdiagnosed or diagnosed later, as many of our women interviewees with autism and ADHD mentioned regarding their own personal experience. The gender barrier is significant, since the lack of a diagnosis or its delay prevents access to accommodations. Secondly, some of our women interviewees with autism also reported "masking" quite frequently (suppressing certain behaviors related to autism) in order to fit in, and explained how costly that was in terms of their motivation, energy, and well-being. Unlike their male counterparts, the autistic women in our study also reported encountering more incredulous reactions by peers upon disclosure of their diagnosis, being told they don't "look autistic". In addition, gender minorities in CS are more likely to experience gender-based discrimination and microaggressions: Two of the women in our study reported negative experiences with the widespread culture of sexism they encountered in their department.

Immigrant status might mean either delay or lack of access to disability support. According to current regulation, to receive disability support one must "Be a Danish citizen or, according to international agreements, have the right to support on equal footing with Danish citizens (for example, be an EU or EEA citizen) or be on an equal footing with Danish citizens" [15]. An immigrant student who partook in our study has reported several months of delay in the allocation of her accommodations.

Having **multiple diagnoses, or more complex access needs** renders some of the challenges encountered more complex, as access labor increases accordingly. Parental or caregiving status can similarly add challenges due to extra effort and time devoted to caring for someone else - therefore less time and energy to devote to access labor, as one of our research participants, a student with small children, reported.

Socio-economic status is also a variable that influences equal access. Even though Denmark offers universal healthcare, there are extensive delays in the public mental health system - some of our interviewees have chosen to pay high fees for private medical diagnoses to avoid delaying their accommodations for several months. Several students also reported paying privately in order to be able to study on equal footing with their peers. This included paying for private academic support and for domain-specific screen-readers, and - in one case - paying for multiple doctor's notes each time applications for special accommodations were required, due to the lack of a formal diagnosis.

5.3 Students create collective access with local micro-interventions

Many of our interviewees reported being actively involved in breaking down some of the access barriers, pushing for organizational change in more or less direct ways. In this section, we document some of the many ways in which the neurodivergent students in our study acted as agents of accessibility, generating new knowledge and organizational practices, carving new

connections across stakeholders, and working towards collective access in and outside of their CS departments.

Table 4 Micro-interventions

1. From spoon theory to spoon practice

- A CS student with chronic illness became a mentor for social activities, facilitating the creation of inclusive guidelines for social events at her institution (otherwise non-existing) using “spoon theory” as a foundation. Guidelines include precise and clear scheduling, multiple options as alternatives for energy-consuming activities, alternatives to alcoholic drinks etc. The student stated that by being a mentor, she wanted to give visibility to chronically ill people, with the goal of reducing stigma and misconceptions, explaining that “it’s nice for people to see that you can do social stuff when you are sick”.

2. Remixing technology for remote and blended access

- A neurodivergent student, together with classmates, created and maintained a Discord channel during the Covid-19 pandemic, to support social connection – the channel became soon popular with teachers and TAs to scaffold various academic activities. Post-pandemic, students used the platform to support new ways to collaborate and do group work inclusive of different needs. One of the autistic students in our study developed a remote work-flow for group work together with his peers, using the Live Share feature of VS Code, while his group mates meet in person, all the while using the Discord voice chat.

3. Research-based scaffolding and practice-based workflow hacking

- A neurodivergent support teacher (a junior researcher tasked with providing academic support to a neurodivergent student) has shared accessibility hacks and alternative work-flow suggestions with their students – cutting down workload, prioritizing mental health, and substituting reading with alternative visual content like videos were some of the adaptive strategies to reduce stress and lower cognitive load.
 - A dyslexic student, frustrated by the lack of focus on accessibility, has provided local staff with research-based advice on how to scaffold programming education to be more inclusive for people with dyslexia, encouraging the department to become more inclusive.

4. Slipping Accessibility in the curriculum

- Some of our interviewees have designed project work or thesis around themes related to neurodiversity and cognitive accessibility. Some also expressed the wish to design technology that is helpful for others as part of their career plans.

5. Carving new connections

- A CS teacher, a disability officer and the first author of this paper created a new opportunity for collaboration between disability services and the first-year CS teachers’ group – organizing a lecture led by a disability officer on the access needs of neurodivergent students in computer science.

6. Neurodiversity awareness and countering stereotypes

- An autistic CS student reported volunteering as a “human book” on autism in the *Human Library*, a Danish non-profit with the goal of breaking stereotypes and prejudice around marginalized identities. She was hired, among others, by Lego for a talk to management on how they can be more inclusive of

neurodivergent employees.

7. Supporting sense of belonging and trust in peer-mentorship

- A queer student-mentor working with a trans neurodivergent student reported intentionally centering trust and LGBTQ+ allyship in the professional relationship with the mentee, extending the organizational tasks with a focus on supporting a sense of belonging.

These micro-interventions represent a variety of collective strategies to break barriers, support and improve collective access and experiment with technology and learning practices in new ways. All micro-interventions are generated from the students' own unique experiences and expertise with being neurodivergent and facing inaccessibility. However, only few of these examples translated into sustainable and long-term organizational change, as many of the student's efforts were not actively integrated by the CS department practices or could not have a direct impact on changing rigid bureaucratic practices. Unequal power relations translate into differential levels of influence in shaping organizational change. But when the micro-interventions were rooted in organizational support and grounded in some awareness and strategic focus on accessibility, they resulted in sustainable organizational change: micro-intervention 1 and 5 resulted in new inclusive guidelines and new institutional collaborations respectively. They were successful because they had full institutional backing and were co-created with people in formal positions within the universities. Micro-intervention 6, by the stigma-awareness student volunteer, also had a wide reach besides being sustainable, since it is part of a formally organized non-profit.

Although the current fragmented and individualized system of support makes it difficult for many of the other documented micro-interventions to sprout into broad and long-lasting organizational growth toward accessibility for neurodivergent students, they opened up new ways of rethinking and redesigning access locally – and have the potential to inform future practices and relations.

6 DISCUSSION

Our findings illustrate that neurodivergent students in CS encounter a range of barriers to access in their *educational environment* and within *the disability support system*. We identified structural and attitudinal barriers in three main areas: (i) Assistive technology access barriers, (ii) Cognitive and physical access barriers, and (iii) Social access barriers, (see Table 3). Barriers are (re)produced within a fragmented ecosystem that lacks intra- and infra-organizational knowledge creation, organization and sharing about accessibility and neurodiversity. Accessibility in the CS departments included in our study is still organizationally framed as the main responsibility of “special support” services, and the onus of mobilizing support is on the individual student. The expert knowledge of Disability Service officers is siloed: they are not tasked with providing organizational support to teachers or other university staff, neither do they have the resources for it. In addition, disability officers are concerned about sharing data on disability with the departments due to data privacy concerns.

Since current practices do not fully support the multilayered needs of neurodivergent students, they spend considerable time and effort engaging in invisible access labor [11],[88] in order to

have their needs met. These findings unfortunately confirm existing studies on the existence of barriers to equal access in Danish higher education [78],[81] and support previous research demonstrating that universities often act as neurodiversity “cold spots”, presenting a wide range of inaccessibility issues [20],[30]. In addition, we found that the current design of socio-technical systems of support can result in the disruption of pre-existing care networks, particularly when the crucial invisible labor of access partners is not anticipated.

Our analysis also opened up questions of stigma, prejudice, intersectional disadvantage as they shape organizational practices, and examined how students creatively improve collective access through micro-interventions, although these efforts are also largely invisible.

6.1 Barriers are multilayered and intersectional

By adopting an intersectional approach to neurodiversity, we extend the current research on neurodiversity in academic settings by emphasizing how factors like gender, immigrant status, mental health - and more - are influential in shaping the experience of students, intensifying access barriers. For example, gendered and racialized patterns of under-diagnosing or late diagnosis [4],[69], preclude or delay access to accommodations, which adds to other barriers experienced by historically underrepresented groups in CS [10],[21],[53]. The women in our study reported more laborious patterns of diagnosis and were diagnosed later compared to the men. In addition, women with autism were more likely to self-report experiences with invalidating comments on their identity (“you don’t look autistic”) and relied on *masking* more often, in order to fit in, which is consistent with research on gender differences in autism camouflaging patterns [40]. By including the underrepresented experience of people with acquired neurodivergence (developed as a result of trauma, illness, and traumatic brain injury) we highlighted how additional physical symptoms and the challenge of disclosing vulnerable personal information regarding trauma had an influence on the availability of accommodations and the willingness to disclose one’s diagnosis in order to find support.

These findings have important implications for the design of socio-technical systems supporting equal access for neurodivergent students. We suggest that institutions adopt an intersectional approach when mapping inequitable conditions, focusing on those stemming from the overlap between different systems of oppression rather than focusing narrowly on only gender, or ethnicity. This can be done by explicitly taking a multidimensional approach to explore issues of inequity in computer science [64].

6.2 Increasing literacy and training to empower change from below

Misunderstandings, knowledge gaps, unidirectional data flows and lack of literacy about disability and neurodiversity contribute to creating multiple barriers, both attitudinal and structural. These findings show that there is urgent need to work strategically with literacy on disability and neurodiversity in universities and in the third-party organizations involved in disability support, to design and facilitate more inclusive environments and socio-technical systems. A good place to start is incorporating structured approaches like Universal Design for Learning (UDL) which is officially recommended - but currently not officially “reinforced” - by the Danish state as a way to make education more accessible [81]. Or following guidelines for cognitive accessibility [25],[86] to make more inclusive technical systems. But along with the strategic development of new competences based on research- and practice-based guidelines, we suggest that universities also focus on the opportunity to **empower and support neurodivergent students in creating collective access**. The Disability Services officers’ concerns about sharing data related to

disability should also be addressed. Teachers and other staff at the Computer Science departments could benefit from information sharing – statistics on neurodivergent students would make their presence more visible, and could be used to provide (and argue for) better support. According to Danish GDPR regulations, processing of special categories of personal data - such as disability – might take place for tasks carried out in the public interest. Though public interest is not clearly defined, universities should be able to demonstrate a compelling reason for disclosing statistical data in order to inform accessibility, equity and inclusivity initiatives in the interest of students.

Our study documents how students – and sometimes staff – facilitated change by collaboratively creating **local micro-interventions** to improve access. We see these micro-interventions as foundational in processes of access *knowing-making* [35], as they activate new ways of experimenting with technology, countering stigma and facilitating mutual support. Students acted as *institutional plumbers* [2] getting accessibility knowledge and practices into their institutions. The micro-interventions center values and approaches that are missing in practice: access intimacy [56], an emphasis on research-based methods for accessible teaching, new ways of experimenting with remote access and multimodality, spoon theory, activating new connections and knowledge sharing across siloed units, and anti-stigma literacy. But despite the historically prominent role of students with disabilities in shaping collective access in universities [35], Danish CS students are still largely framed as the passive recipients of parallel systems of bureaucratic support, rendering both their access needs and their micro-interventions invisible in their departments. This is a missed opportunity for growth and change.

6.3 Implications for practice: access grafting

We propose **access grafting** as an approach to rethink and redesign organizational strategies to improve equal access. By grafting, new branches of *knowing-making* are added to existing structures and practices. In order for these ideas and initiatives to spark, grow, be visible and transformed into sustainable long-term practices, branches need to be subsequently *infrastructured* [44] into the hybrid system of organizational artefacts, practices, and policies. To be clear, we are not suggesting that neurodivergent people and their allies should be the main responsible for driving inclusivity and change – as there is already a tendency in academia to allocate practical inclusivity work to minorities, which has negative implications - the so-called “minority tax” [65] and might relegate certain areas of work within the academic service/volunteer domain – rendering them invisible - rather than becoming a core part of the organization’s strategy field [2],[8]. This means, in practice, that through access grafting organizations must ensure a solid base of literacy and competence development on accessibility; identifying existing organizational units/stakeholders (or create new ones) which can support the growth of bottom-up initiatives by neurodivergent communities and their allies.

Access grafting – the process of artfully integrating new branches of access knowing-making by neurodivergent people and their allies - is grounded on the following principles:

- **COLLABORATION:** Identify and engage multiple *access partners*, which includes teachers, TAs, Board of Studies, disability officers, exam proctors, care networks, peer-support networks, exam offices, advocacy groups and third-party disability support organizations
- **INTERSECTIONALITY:** Consider and anticipate how *intersecting social dimensions* (gender, international status, socio-economic status, etc.) and *co-occurring mental health conditions* can intensify access barriers and access labor.

- **SITUATEDNESS:** Recognize that assistive and accessible technology are always *socio-technical* in nature, as they are situated into specific contexts, digital and physical spaces, activities and domains. This includes considering local privacy concerns about sharing disability data, for instance, creating awareness about the possibility to process and share statistical information for tasks carried out in the public interest of students.
- **MULTIPLICITY:** Anticipate and value the *multiple skills and access needs* of neurodivergent students, spanning across multiple areas: cognitive, sensory, physical, emotional, and social.
- **CRIPPING THE CLASSROOM:** Be open to experimenting with radically new approaches that center disability and accessibility in teaching, learning and social activities, even if they might challenge normative ways to define and conduct activities in the university.

By centering **collaboration**, we frame accessibility as work that engages a collective of access partners, rather than framing it solely as “special support” delivered by a few professionals within a parallel bureaucratic system. This involves shifting towards systems and practices that emphasize sharing datasets and knowledge, rather than upholding siloed structures. This also mean designing disability support systems that allow access partners like parents to interact with services and interfaces, supporting the work of existing care networks.

By using a lens of **intersectionality**, we can design socio-technical systems that take into account the extra burden of access labor shouldered by neurodivergent students with marginalized identities, students with multiple disabilities or more complex conditions, students experiencing stigmatized mental health conditions, and students from less privileged backgrounds. This means, for instance, taking steps in countering stigma around the co-occurring mental health conditions that neurodivergent individuals are more likely to experience.

By recognizing the **situatedness** of assistive and accessible technology we avoid one-size-fits-all solutions (like providing generic screenreaders that are not designed for STEM fields) and we anticipate what spaces and resources students with cognitive disabilities need in their everyday life.

By centering **multiplicity** we consider the complexity and range of skills and needs of the students, and avoid essentializing each category. This could mean, for instance, becoming more aware of stereotypes around autism and how they impact autistic students, and finding ways to challenge normative understandings of cognitive disabilities.

By **cripping the classroom** we can shift epistemic practices and center marginalized topics such as disability and accessibility. We can introduce critical discussions on how norms and assumptions shape the design of IT artefacts and systems – while also opening new spaces for students’ creativity and experimentation.

In conclusion, the access needs of neurodivergent students in Computer Science are many and varied – and so are their everyday contributions to creating collective access. Strengthening competence development and literacy on neurodiversity and accessibility in the academy and in disability support organizations is a necessary first step to artfully integrate bottom-up strategies for equal access.

7 CONCLUSION

In this study, we examined the invisible access labor of neurodivergent students in Computer Science in three Danish universities. We show how students are both *contributors and recipients of*

access and support. We found that neurodivergent students encounter a range of structural and attitudinal barriers to equal access in three main areas (Assistive Technology; Cognitive and Physical Accessibility; Social Accessibility), which are caused by gaps in intra- and intra-organizational knowledge creation, organization, sharing, and use. We highlighted how barriers to access are intensified by intersecting social dimensions such as gender, nationality/immigrant status, co-occurrence with mental health conditions and multiple diagnoses. Additionally, we found that relevant social dimensions like pre-existing care networks and the invisible labor of other access partners (like family members) are currently not taken into consideration in the design of socio-technical systems of support.

We documented how neurodivergent students actively create everyday micro-interventions that generate and improve collective access, carving new pathways of knowing-making across multiple stakeholders, counteracting stereotypes and caring for each other. Building on these collective efforts as a way to reorient change in organizations, we propose *access grafting* as a strategy to artfully integrate new branches of access knowing-making by neurodivergent people and their allies in our institutions - provided that universities and disability support organizations ground this bottom-up, transformative approach in a more concrete strategic commitment towards equity.

CSCW research has conceptualized the intricacies of cooperative engagements – and identified core concepts such as articulation work [9],[68], awareness [32],[34] and coordination [31]. However, there is a historical lack of CSCW empirical studies that explicitly consider accessibility and the experience of people with disabilities in cooperative engagements. For this reason, CSCW research has traditionally assumed a normative embodiment when designing and conceptualizing cooperative engagements, downplaying how social norms and power dynamics – combined with disability – shape how socio-technical systems are designed and enacted. Similar critiques have been advanced in HCI [39],[67],[73] calling for more focus on designing for plurality (of needs, of bodies) against normative understandings of “users”. In our study we consider how non-normative individuals (with different needs) encounter systems and organizational practices that require considerable access labor on their behalf, negatively shaping the efforts of articulation work. The notion of access labor (or access work) is prominent in accessibility and critical access studies [35],[70],[88] and it conceptually extends core CSCW understandings of articulation work. Since access labor is always cooperative - and a multiplicity of bodies with a spectrum of needs exist in each cooperative engagement – access labor is a critical concept that extends the CSCW vocabulary and design practices. This paper pushes towards a broadening of core CSCW conceptual work by proposing access labor as an extension and potential nuancing of articulation work.

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