

Lack of Access to STEM for Disabled Students

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Master of Environmental Science Application

12/31/23

Being able-bodied isn't something we get to keep forever. We can become disabled from cancer, aging, or a variety of other options, but at some point, everyone becomes disabled. The *Annual Report on People with Disabilities in America* states that 19% of the 2021 college population was disabled (Houtenville, 2023). While ADA law requires reasonable accommodations in colleges to be provided and paid for at no expense to the student, "Current U.S. law has not been fully successful in helping higher education students with disabilities" (Love et al., 2014). Suppose a school has not implemented specific accessibility. In that case, the student must then figure out how they can be accommodated or, worse, left hanging if it is deemed to cause undue financial or administrative burdens (U.S. Gov. Accountability Office, 2009). On top of this, college STEM has additional barriers within lab and field spaces.

Getting a job or career in STEM requires a rigorous scientific background from college, but additional barriers make it harder to achieve. A review by Olson and Riordan (as cited in Schreffler et al., 2019) found that "Nationally, fewer than 40% of undergraduates who intend to major in a STEM (science, technology, engineering, math) field complete a STEM degree." There are fewer preexisting accommodations for students to use in lab and field spaces, such as high tables, wheelchair-inaccessible lab or field spaces, and social stigma can dissuade disabled students from the hard sciences (U.S. Gov. Accountability Office, 2009). Faculty often cannot assist due to institutional gaps, ignorance, or apathy toward their students' struggles.

Training on how accommodations work is not built into institutional norms, so additional training for how accommodations work is usually not given to faculty. This means that they must gain this experience on the job, frequently from disabled students themselves, who should not have to do this. Students will self-disclose to improve their chances of better

help from their professors, but this isn't something all disabled students can or should have to do. "Faculty members' lack of experience working with students with disabilities and a lack of awareness and understanding of legal requirements has caused faculty members to resist providing legally mandated accommodations," (Love et al., 2014). For example, when a student needs a beehive to be wheelchair accessible to participate in a program including beekeeping, and is delayed or unmet, they cannot fully participate in class. If accommodations were built into the curriculum, like with Universal Design, this would reduce the burden on both students and teachers while benefiting those who could not meet the barrier of documenting their disability. However, "Universal Design for Learning is not widely used in postsecondary STEM education," (Schreffler et al., 2019). UDL is not just for those with disabilities; it benefits all students within the classroom, and it is simple for a student to not partake in an optional benefit (Schreffler et al., 2019).

Ableist norms say you cannot succeed in the field if you cannot meet the rigidity and performance set in STEM. That is because the professors themselves had to struggle in their field or saw others drop because they could not cut it. This is the mark of success in the rigorous fields of STEM. However, this only perpetuates a cycle in which those who do not fit into an able-bodied system are doomed to fail. Science is a group problem-solving effort, so it needs to better support these diverse minds to help solve current and future issues. An example is Temple Grandin, an autism activist, her most recent book, "Visual Thinking: The Hidden Gifts of People Who Think in Pictures, Patterns, and Abstractions" (Grandin, 2022), shows that when visual thinkers, who currently fall through the cracks in academia, are cultivated, they can excel in pattern recognition and systemic thinking. For example, in a presentation to the Royal College

of Psychiatrists in Wales, Dr. Michael Fitzgerald of Trinity College argued that Charles Darwin was likely on the autistic spectrum given the level of visual thinking present in his work on evolutionary biology (Culliton, 2009).

Thankfully, there are a few support systems in place beyond relying solely on faculty to create accommodations which is unfair to both faculty and students. In postsecondary education, disability service offices, and TRIO Support Services are the main two supports. First, disability services work with approved students individually to find reasonable accommodations to help them in the classroom. However, these services are dependent on the knowledge of both staff and faculty of the specific colleges and universities. This means students might only get these necessary services if they are explicitly asked for at universities under-equipped or undereducated about disability services. Additionally, to request these services, students must provide documentation of their disability. For example, in the Evergreen State College's Fall 2023 Enrollment report, 19.9% of undergraduates report having a disability, while only 11.4% have a documented disability. This means that almost half of the students reporting disability may not have access to existing services or must go through additional hoops to get their disability documented.

Second, TRIO Support Services is a Federal outreach program aiming to increase marginalized participants' college retention and graduation rates. Some of the groups they provide support to include disability status, race, and gender identity, who can access these services at their discretion once approved. TRIO tailors its support to help bridge the gap where these marginalized groups are left behind, such as providing tutors in scientific subjects, and access to resources from a TRO advisor. These advisors have more availability than regular

advisors, allowing weekly appointments and seeing only their TRIO students. However, some universities require that students with disabilities first go through Disability Services to access TRIO, unlike the remaining student populations they serve, assuming they know TRIO exists. It should be emphasized that undergraduate students whom TRIO helped succeed are left without this support if they pursue graduate school. This can make graduate work seem more daunting without this crucial disability support system, contributing to fewer disabled students pursuing graduate school (Enrollment Summary, 2023). Without a service like TRIO, disabled graduate students have less support in a more challenging program while still experiencing the original barriers created by disability.

There is one post-baccalaureate program, the McNair program, that aims to prepare students for doctoral studies and increase Ph.D. degree attainment for marginalized groups. Yet, it is much more limited, as “...in Washington, we have 5 McNair Programs serving 108 participants” (WA Factbook, 2018). In comparison, TRIO had over 15,000 participants in Washington state in 2018 with over 4,000 in Congressional District 10 where TESC resides, which does not have a McNair program (WA Factbook, 2018). While graduate programs are more competitive than undergraduate ones, the support reduction only makes the entry barrier higher for disabled students in addition to the other barriers still present. We need more access to resources and implementation of UDL to enable students from many different backgrounds to succeed at all college levels as the academic rigor increases.

Discrimination in the workforce is commonplace, as with other marginalized groups frequently requiring advanced degrees to help overcome systemic ableism. Helping students finish high school and get into college, and then helping them succeed in finishing their

undergraduate studies, is required. Many STEM careers, such as astronomers or biophysicists, require a Master's or Ph.D while others may require them for upper-level positions (Smithsonian, 2015). Even being an advisor in TRIO requires an advanced degree to help students with disabilities, even if this is their lived experience.

Intersectionality within marginalized identities compounds upon institutional ableism via institutionalized racism/sexism and the stigma often associated with disabilities. This can impact how or if they get their accommodations, regardless of whether the condition is visible. We need more intersectionality and support in STEM for marginalized populations. "When higher education leaders help to accommodate these students, more students will be college and career-ready for critical shortage areas such as STEM (Love et al., 2014)". More education and training for faculty is needed; this would allow for increased knowledge of how accommodations work and help them be more flexible in their teaching methods. On a teacher level, pedagogies can be improved, but there comes a point where they are limited by what systems and resources are in the place where they teach. None of us are permanently able-bodied, which the Pandemic has shown us with "Long COVID" (Yong, 2021) that anyone at any time can become disabled and learn firsthand how inaccessible society is.

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