TOWARDS UNDERSTANDING THE CHALLENGES, NEEDS, AND OPPORTUNITIES PERTAINING TO ASSESSMENT TECHNIQUES FOR AUTISTIC COLLEGE STUDENTS IN COMPUTING

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WHY STUDY AUTISTIC COLLEGE STUDENTS’ EXPERIENCE?

• In USA, 1 in 36 children identify as *autistic*

• Over half a million autistic children will be in their *adulthood* over the next decade
  • 45% of them will pursue post-secondary degrees

• Unfortunately, only 38.8% of post-secondary autistic students are expected to complete their degrees
WHY FOCUS ON COMPUTING EDUCATION?

• At least **1.9%** of the students enrolled in college in the USA are autistic

  • The number is likely to be **much higher** as many autistic and other neurodivergent college students do not disclose their diagnosis status

• Many of these autistic college students choose **Computing and STEM majors**

• However, the graduation rate of autistic students is **much lower** than that of neurotypical students and students with other disabilities
POSITIONALITY AND LANGUAGE

• Positionality
  • Research team consists of 2 autistic student researchers and three faculty researcher who have years of experience teaching and mentoring autistic students
  • The research team align itself with the Social Model of Disability (and Autism)

• Language
  • We use identity-first language (autistic student) as opposed to person-first language (student with autism)
    • Preferred by autistic self-advocates and autistic research team members
What factors impact autistic students’ college experience, especially in Computing?

- Opportunities
- Challenges
- Needs
METHODOLOGY

• **Keyword-based** systematic literature review using the **PRISMA** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)

• Databases searched: ACM Digital Library and Google Scholar

(Computing Education OR CS Education OR CS Courses OR STEM) AND
(Survey OR Interview OR Question* OR exam* OR quiz OR assignment) AND
(Neurodiverse OR autis* OR asperger* OR “pervasive developmental disorder” OR ASD OR ADHD OR ADD OR ADHD-* )
METHODOLOGY

Identification

Articles identified from:
Databases (n = 2)
ACM Digital Library
Google Scholar

Screening

Articles screened by Title and Abstract (n = 3,196)

Inclusion

Articles assessed for eligibility (n = 141)

Articles included in analysis (n = 44)

Articles excluded:
Duplicates (n = 7)
Published before 2013 (n = 47)
Not Relevant (n = 3,001)

Articles excluded:
Not Higher Education (n = 63)
Not focused on Neurodiversity (n = 13)
Focused on general disability (n = 16)
Other reasons (n = 5)
DATA ANALYSIS

- Atlas.ti for Qualitative coding using Grounded Theory

<table>
<thead>
<tr>
<th>Coding Phase</th>
<th>Number of Codes</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>203</td>
<td>autism_college_support, challenge: group work, autism_accommodation_solution_strategies, and autism_college_challenges</td>
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<tr>
<td>Axial</td>
<td>11</td>
<td>Accommodation, College Challenges, Online Learning, Universal Design</td>
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<tr>
<td>Thematic</td>
<td>4</td>
<td>Assessment, Accommodation, Multiple Facets of College Experience</td>
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FINDINGS: ASSESSMENT CHALLENGES

• Challenges with assessment are multi-faceted
  • Executive Functioning issues (an autistic trait) and not a lack of academic knowledge and capabilities are primary reasons behind academic challenge
  • Challenges experienced by students and Accommodations provided by universities are ill-matched
  • Gap between Neurotypical (faculty, TA, peers) and Neurodivergent Communication-style impact academic work and success
FINDINGS: ASSESSMENT OPPORTUNITIES

• Opportunities with making assessments inclusive are multi-faceted
  • Utilizing Universal Design of Learning Principles can enhance Accessibility
  • Utilizing Cutting-edge (Generative-AI-based tools) and Everyday Technology (video recording of class) to improve academic experience
    • Providing access to academic materials outside classroom for review (to address issues related to sensory- and cognitive overload)
  • Help reducing Anxiety
• Supporting Different Learning Styles (visual, analytic)
FINDINGS: ACCOMMODATIONS

• Many different types of accommodations are available
  • Example: Different exam space provided by Disability Access Centers

• Almost all these accommodations are designed for general disability
  • Example: Note taking for visually-impaired students, Visual aids for hearing-impaired students

• Most existing accommodations do not cater to autistic students’ specific needs
  • Example: A separate quiet exam space do not provide access to instructors
FINDINGS: ADDITIONAL ACCOMMODATION CHALLENGES

- Accessing accommodations are non-trivial and complex
  - Disclosing autistic-identity is challenging in multiple dimensions
    - Social Stigma
    - Lack of understanding and awareness related to autism
    - Perception of self
  - Socio-communication issues prevalent among autistic students makes it harder to seek accommodation
  - Absence (and a lack) of faculty and teaching staff trained to provide adequate accommodations
  - Existing accommodations only focus on academic aspects
    - Ignores challenges with other aspects of college experience (socialization, mental health, loneliness, depression)
FINDINGS: ACCOMMODATION OPPORTUNITIES

• Designing accommodations based on Social-Model of Disability may enhance acceptability
  • Using Social model over Medical model may reduce stigma
  • Incorporating autistic voice in designing accommodation
  • Strength-based design vs. need-based design
  • Enhanced autism-awareness may improve the accommodation process
DESIGN IMPLICATIONS

• **Personalized and customized academic content** can reduce challenges with comprehension

  • **Challenge**
    • Autism is a spectrum, and as such autistic students’ needs are varied
    • Puts additional burden on the instructors
  
  • **Opportunity**
    • Using generative-AI based tools that can utilize Large Language Models to appropriate academic content
DESIGN IMPLICATIONS

• Incorporating Autistic Voice in Accommodation Design process can enhance effectiveness
  • Challenge
    • Autistic students’ may not be willing to disclose identity
    • Preserving privacy and anonymity can be challenging
  • Opportunity
    • Adaptation of Universal Design of Learning and other inclusive academic content creation models can be helpful for ALL students
    • Collaborating with autistic advocates and experts may encourage autistic students’ participation
DESIGN IMPLICATIONS

• Well-designed Mentoring program can improve college experience

• Challenges
  • Mentoring only works when mentors and mentees are well-matched
    • Mentors understand mentees’ communication style and experience
    • Finding appropriate mentors is not trivial
      • Many autistic students do not disclose their condition

• Opportunities
  • Well-designed Online social networking groups can be used to effectively connect autistic mentors and mentees
LIMITATIONS

• Research aimed to address challenges faced by autistic adults (and college students) is scant.

• Autistic college students’ experience in Computing (their preferred academic discipline) is also under-researched (1 paper in our repository is from computing).

• Research focusing on college experience holistically is largely missing.

• Almost all research is from economically developed countries (North America, Europe, Australia), making it difficult to generalize findings.
CONCLUSION

• Autistic students are increasing becoming a large part of computing education

• Autistic students’ “lesser” success rate can be effectively addressed by enhancing accessibility and inclusiveness of academic content

• Enhanced awareness regarding autism will improve the overall college environment
QUESTION?

• For more information, please contact
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