Inclusive Education

05-499/899 Fall 2024

Celebrating Accessibility

https://cmu-05-499.github.io

Andrew Begel and Patrick Carrington

Administrivia

- P4 – Project Milestone 1 due Thursday Nov 14, 11:59pm
- Please keep up with your weekly TA project meetings!

Agenda

- Individualized Education Programs
- Universal Design for Learning
- Making University Education more Accessible

IDEA – Individuals with Disabilities Education Act

- Educational services must be individually designed to meet a child's unique needs in the least restrictive environment.
- Procedural Safeguards – Rights
  - The Right to Receive a Non-Discriminatory Assessment, Receive an Independent Educational Evaluation, Be Informed of School Discipline Policy
  - The Right to Participate, Receive Prior Written Notice, Give or Refuse Consent, Confidentiality, Amend Student Records, File a Complaint, Mediation and to Stay in the Current Program, Request a Due Process Hearing

IEP – Individualized Education Program

- Annual Goals
  - Knowledge
  - Skills
  - Behaviors
- Goals must be
  - Measurable
  - Focused on their needs
  - Reviewed and reported on regularly

Parts of an IEP

- Special Education Services
- Accommodations
  - Per Class
  - Per State Mandated Test
- Participants
  - Parent/Guardian
  - Special Education Teacher
  - General Education Teacher
  - Administration

Example IEPs

- Dyslexia: http://untrainedhousewife.com/wp-content/uploads/2020/08/Micah-IEP-Accommodations-Example.pdf
- Autism: https://ospi.k12.wa.us/sites/default/files/2022-12/iep-f.pdf
- Blindness or visual impairments: https://www.perkins.org/resource/a-guide-to-common-cvi-iep-accommodations/
- Deaf or hard of hearing: https://www.handsandvoices.org/pdf/IEP_Checklist.pdf

Assistive Tools for Learning Disabilities

- Dyslexia
  - C-Reader Pen – scans text and reads aloud
  - Libby Library App – Free Audio Books
  - Audible Audiobooks
  - Kurzweil 3000 – Reads computer text out loud
- Dysgraphia
  - Pencil grip
  - Wide-ruled notebook
  - Whiteboards
  - Word Autocomplete
  - Use of Tablet or Computer for Writing
  - AI Notetaking Apps: Otter.ai

Assistive Tools for Blind or Visually Impaired Students

- Tools
  - Increase contrast, enlarge images
  - Audiobooks
  - Braille keyboard, printer, books, labeler, refreshable display
  - Large-print books
  - Adaptive paper
  - Screen reader
  - Digital recorder
  - Abacus
  - Tactile graphics, manipulatives (for math)
  - 3D models
- Staff
  - Visual interpreters

Assistance for Hard of Hearing

- Staff Support + Training
  - Classroom aide
  - ASL Interpreter
  - Notetaker / transcriber
- Assistive Technology
  - Wireless microphone (e.g. Phonak Roger)
  - Hearing Loop (room-based sound transmission)
- Presentation
  - Captioning or ASL interpreter

IEPs End at University

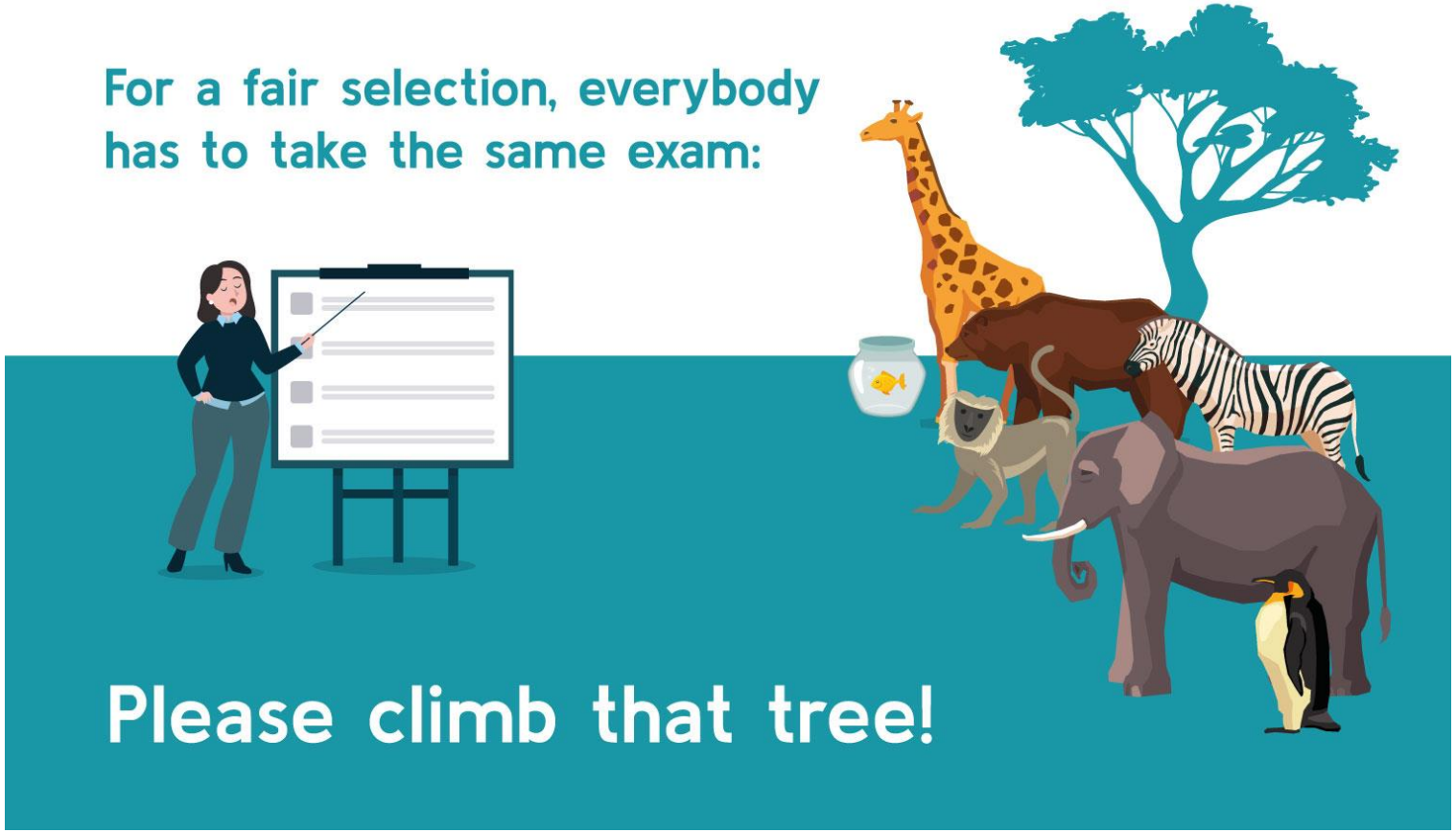
- At CMU, students voluntarily engage with the Office of Disability Resources
  - Work with a counselor to turn diagnoses and needs into accommodation requests for classes.
- Parents, guardians, family, friends, all stay home.

- What if you have a disability but don't think you need any help?

Discussion of Readings

- Universal Design for Learning Guidelines
- Differentiating for Diversity: Using Universal Design for Learning in Elementary Computer Science Education
- Neurodiversity and the Accessible University: Exploring Organizational Barriers, Access Labor and Opportunities for Change
- Deaf Kids Code
- Accessible Computing Education in Colleges and Universities

Universal Design for Learning



Universal Design for Learning - Access

Access

Design Multiple Means of **Engagement**	Design Multiple Means of **Representation**	Design Multiple Means of **Action & Expression**
		
Design Options for **Welcoming Interests & Identities** (7) • Optimize choice and autonomy (7.1) › • Optimize relevance, value, and authenticity (7.2) › • Nurture joy and play (7.3) › • Address biases, threats, and distractions (7.4) ›	Design Options for **Perception** (1) • Support opportunities to customize the display of information (1.1) › • Support multiple ways to perceive information (1.2) › • Represent a diversity of perspectives and identities in authentic ways (1.3) ›	Design Options for **Interaction** (4) • Vary and honor the methods for response, navigation, and movement (4.1) › • Optimize access to accessible materials and assistive and accessible technologies and tools (4.2) ›

Universal Design for Learning - Support

Support

Design Multiple Means of **Engagement**	Design Multiple Means of **Representation**	Design Multiple Means of **Action & Expression**
		
Design Options for **Sustaining Effort & Persistence** (8)	Design Options for **Language & Symbols** (2)	Design Options for **Expression & Communication** (5)
• Clarify the meaning and purpose of goals (8.1) > • Optimize challenge and support (8.2) > • Foster collaboration, interdependence, and collective learning (8.3) > • Foster belonging and community (8.4) > • Offer action-oriented feedback (8.5) >	• Clarify vocabulary, symbols, and language structures (2.1) > • Support decoding of text, mathematical notation, and symbols (2.2) > • Cultivate understanding and respect across languages and dialects (2.3) > • Address biases in the use of language and symbols (2.4) > • Illustrate through multiple media (2.5) >	• Use multiple media for communication (5.1) > • Use multiple tools for construction, composition, and creativity (5.2) > • Build fluencies with graduated support for practice and performance (5.3) > • Address biases related to modes of expression and communication (5.4) >

Universal Design for Learning – Executive Function

Executive Function

Design Multiple Means of **Engagement**	Design Multiple Means of **Representation**	Design Multiple Means of **Action & Expression**
		
Design Options for **Emotional Capacity** (9) • Recognize expectations, beliefs, and motivations (9.1) › • Develop awareness of self and others (9.2) › • Promote individual and collective reflection (9.3) › • Cultivate empathy and restorative practices (9.4) ›	Design Options for **Building Knowledge** (3) • Connect prior knowledge to new learning (3.1) › • Highlight and explore patterns, critical features, big ideas, and relationships (3.2) › • Cultivate multiple ways of knowing and making meaning (3.3) › • Maximize transfer and generalization (3.4) ›	Design Options for **Strategy Development** (6) • Set meaningful goals (6.1) › • Anticipate and plan for challenges (6.2) › • Organize information and resources (6.3) › • Enhance capacity for monitoring progress (6.4) › • Challenge exclusionary practices (6.5) ›

Applying UDL to Neurodiversity (Engagement)

- Be flexible in topic area for assignments.
  - Autistic students must be interested in the topic or may just decide to opt out.
- Support various motivators
  - Some students with ADHD will be much more strongly motivated by impact on people.
- Scaffold social activities and communication
  - Provide explicit instructions on reading, writing, speaking, listening, and especially teaming. Don't assume that students will pick this up by watching others.
- Support self-regulation
  - Some students think better when physically active. Others need to sit quietly.
  - Recorded, captioned lectures support comprehension and self-assessment.

Applying UDL to Neurodiversity (Representation)

- Screen readers and auto-captioning can help those with slower verbal and numerical processing capabilities (e.g., dyslexia and dyscalculia).
- Use headers, sections, visual charts appropriately in instructions and documentation. Record videos and podcasts to provide alternate representations for those who learn better by watching and listening.
- Mathematical and engineering symbols can be challenging for people with dyslexia and non-native speakers. Converting these into natural language can help.
- Model beneficial comprehension strategies
  - Reading code, instructional info, API docs

Applying UDL to Neurodiversity (Expression)

- Students with dysgraphia may not be able to handwrite their homework. Support electronic submission and handwriting recognition software for non-textual content.
- Autistic and dyslexic students often prefer visual media to text. Provide alternate means to communicate knowledge for assignments that include photos, videos, graphics, animations, or spoken conversations.
- Scaffold executive functioning for those who lack experience or skills.
  - Goal setting
  - Planning and strategy
  - Managing information and resources
  - Keeping track of progress and deadlines

Participation Activity #1

- Form groups of three people and write your names on a piece of paper.
- Use UDL to create instructions for an undergraduate final design presentation assignment
  - The student team has 3 students. One is autistic.
  - Address each of the following with at least one special instruction:
    - Engagement
    - Representation
    - Action and expression
- Discuss.
- Turn in your papers at the end of the class.

Making CS Education More Accessible

- Accessibility should be a cultural competency across computing.
- Teach accessible design and engineering
- Accessibility addresses student and faculty needs
- Institutional adoption and commitment to new cultural norms, technologies, and practices
- Needs and interests of people with disabilities are part of everyone's needs.

Faculty Are Biased

- Course content and pedagogy are often inaccessible and require much labor to make accessible for individual students.
- Strong ableist belief (without evidence) that many students are abusing disability services to receive accommodations to help them cheat.
- If students do not succeed with original course materials, they are bypassing our “meritocratic” system.

What are the primary weaknesses in faculty knowledge and attitudes related to disability?

Organizational Barriers to Accessibility

- **Cost of Entry:** Disability Service offices require proof of diagnosis to obtain accommodations, but these can be prohibitively expensive.
- **Access Labor:** The burden of negotiating and seeking equitable access to organizational services, technologies, and resources.
- **Anticipation of Access Needs:** Assistive technology can help people with specific functions, but only if the organization and faculty are ready to anticipate and support its use.
- **Learning Curve:** Even when students receive accommodations and assistive technology, they lack enough training and time to learn how to use them effectively.

Valeria Borsotti, Andrew Begel, and Pernille Bjørn. 2024. Neurodiversity and the Accessible University: Exploring Organizational Barriers, Access Labor and Opportunities for Change. Proc. ACM Hum.-Comput. Interact. 8, CSCW1, Article 172 (April 2024), 27 pages. https://doi.org/10.1145/3641011

Individual Barriers to Accessibility

- Unrealistic expectations
  - Computing classes have rigid pacing and intense workloads. These often do not match with students' patterns of energy reserves.
  - Unstructured social activities can lead to social anxiety and avoidance.
  - Extracurricular hackathons and coding camps can last for days. Students with chronic illnesses, jobs, medication needs can't easily make this work.
- Availability of recorded videos
  - Pause and replay
  - Language translation
  - Students can catch up after bouts of fatigue, pain, stress, or social anxiety.

Absence of clear accessibility guidelines for pedagogical tools

- Faculty, even when informed of students' needs for accommodations, are ill-equipped to handle them.
- Disability Services helps students with generalized accessibility tools, but computing-specific solutions are up to each faculty member to choose.
- Faculty often do not know how to use the accessibility features of the tools they use in class! This puts the burden on students to learn how to use accessibility tools themselves and teach the instructors.
  - But they haven't yet learned the material the tools are being used for, so they have immense difficulty understanding the tools' features.

Invisible Social Access Needs

- Access needs are addressed through “special support” to individuals
  - But pre-existing care networks, social support, and community building need to play a role.
- Neurodiversity often comes with co-occurring depression and social anxiety.
  - Parents and romantic partners may need to interact with disability support systems, but the systems aren’t set up for this. They may go through third party mentoring services, which discourage contact beyond the client.
  - Students have to interview and hire their own mentors, which induces stress and compounds trauma over the need to discuss their vulnerabilities with strangers.

Stigma and Prejudice

- Faculty and student groups lack literacy in neurodiversity and mental health, resulting in prejudice and negative attitudes.
- Stigma and discrimination inhibits students' disclosure of their needs (and diagnoses).
- Neurodivergence is invisible. When disclosure is made only to instructors, the presence of accommodations leads other students to question why that student is so special to receive them.
- Autistic people, especially women, are often well-practiced at "masking," to hide their autistic traits. However, masking is cognitively and emotionally taxing. At the end of the day, many are tired, masking less, and putting themselves at risk of increased discrimination.

Participation Activity #2

- Pair up with a neighbor and write your names on a piece of paper.
- Pick one disability category: sight, hearing, speech, mobility, cognition, chronic illness.
- Answer the following questions:
  1. What kinds of challenges might faculty with this disability encounter while teaching?
  2. How should universities support faculty with this kind of disability?
- Discuss.
- Turn in your papers at the end of the class.