Universal Design for Learning:
A framework for good teaching, a model for student success

Craig Spooner
Professional Development Coordinator
ACCESS Project, Colorado State University

Marla Roll
Director, Assistive Technology Resource Center
Assistant Professor, Department of Occupational Therapy,
Colorado State University

Universal Design for Learning
Universal Design for Learning (UDL) is a set of principles and techniques for creating inclusive classroom instruction and accessible course materials. Its main aim is to ensure that all students have access to, and can engage with, course materials, expect equal opportunities, and become engaged in learning.

Today's Agenda

Morning

- A little background
  - Student diversity in today’s classrooms
  - Types of disabilities
  - What is UDL and why do we need it?
- Case studies
  - Six profiles of students with disabilities, the barriers they encounter, the tools they use, and techniques you can use to help them.

Afternoon

- Universally-designed course materials
  - Microsoft Word
  - Microsoft PowerPoint
  - Adobe PDF
  - Video captioning
  - Lecture Capture
  - Learning Management Systems
Who are college students today?

They are diverse

- Ethnicity & Culture
- Gender
- Nontraditional
- ESL/Native language
- Disabilities
- Learning/Cognitive Styles

Disabilities in Higher Education

- Nationally, 11.3% of undergraduates report some type of disability
- At Colorado State University:
  - 9%–11% report a disability
  - Among students who say they have a disability, few seek accommodations

---

2 Shelly, Jones, & Stevens, 2013, Journal of Postsecondary Education and Disability
Disabilities

- Mobility Impairments
- Visual Impairments/Blindness
- Hearing Impairments/Deafness
- Learning Disabilities
- Attention Deficit Disorder (ADD/ADHD)
- Autism Spectrum Disorder
- Traumatic Brain Injury (TBI)
- Post Traumatic Stress Disorder (PTSD)
- Mental Illness

Apparent disabilities

Non-apparent

Learning Styles

VARK (Fleming, 1992 and 2006)

1. Visual
2. Aural/Auditory
3. Reading/Writing
4. Kinesthetic

Multimodal (multiple preferences)


Learning Styles

Benefits of a UDL approach

The things you do to help students succeed...
- are essential for some,
- but helpful to the great majority.

Two sides of the UDL coin
What is UDL?

Universal Design (UD)

- Build in accessibility from the start
  - Curb cuts
  - Ramps and automatic door openers
  - Universal-height drinking fountains
  - TV closed captions
- Everyone benefits from a more flexible, user-friendly environment
- Fix the environment, not the individual

Universal Design for Learning

"Universal Design for Learning (UDL)

is a set of principles and techniques for teaching,
creating inclusive classroom instruction,
technology,
and accessible course materials."

""
**Universal Design for Learning: 3 Principles**

1. Instructors *represent* information and concepts in multiple ways (and in a variety of formats).
2. Students are given multiple ways to *express* their comprehension and mastery of a topic.
3. Students *engage* with new ideas and information in multiple ways.

**Representation**

**Expression**
Engagement

Two sides of the UDL coin

Students with Diverse Learning Needs
Mainstream Technologies
Usability

Students with Disabilities
Assistive Technologies
Accessibility

UDL Framework

Engage
Expression

Represent
Two sides of the UDL coin

Student examples

- Apparent
  - Blindness
  - Hearing
  - Motor/physical

- Non-apparent
  - LD
  - ADD or ADHD
  - TBI
  - Diverse learning styles

Nate

- Student who is legally blind
- Computer Science major; Junior
- Considered a power user of assistive technologies
Barriers he experiences in accessing his coursework

- Unable to read the following:
  - Print textbooks
  - Print handouts and study guides
  - PDF's that are image only
  - Visual graphics and formulas

AT used to access his coursework

- Screen reading software
  - Jaws; Voice Over
- Braille translation software for embossing
- Refreshable Braille
- Tactile graphics
- Tiger pro graphics with Braille
- Daisy book player - Stream

UDL solutions that assist:

- Course content in digital formats —
  - Allows for access with Braille or screen reading software
  - Needs lecture content in digital format and ideally ahead of time — allows him to use refreshable Braille or to emboss content
- Universally designed
  - PDF – has to be OCR'ed
  - Word documents - created with Styles
  - PPT presentations to be made accessible e.g. labeling of images
  - Web content
  - Video – descriptive audio
- Needs content uploaded into Blackboard to be accessible (Word docs, PowerPoint, PDFs)
### Teaching strategies - what can faculty do?

- Be descriptive while lecturing (describe all images, charts, diagrams)
- Be consistent in layout of classroom
- Be tolerant of lecture being recorded
- Be thoughtful in grouping students

### Melissa

- Freshman student studying Technical Journalism
- Has a significant hearing impairment
- She does not know sign language
- Can gain some understanding of conversation visually

### Barriers she experiences in accessing coursework

- Multimedia content
- Group work – hearing all speakers and classmates
**AT used to access coursework**

- Personal FM system
- Laptop with C-print
- CART – computer aided real time translation

**UDL solutions that assist:**

- Ideally captioning all multimedia (videos and podcasts)
- Moving microphone to each speaker
- Providing notes and handouts in digital formats and ahead of time

**Teaching strategies - what can faculty do?**

- Remain visually accessible and minimize pacing
- Repeat discussion questions and write on board
- Visually display technical words
- Be thoughtful in grouping students
Jonas

- Junior studying Communications
- Has a mid level spinal cord injury

Barriers he experiences in accessing coursework

- Cannot take notes in traditional way
- Cannot type or write with pen & paper or computer
- Cannot manipulate large textbooks

AT used to access coursework

- Voice recognition software
- Trackball
- iPad (mainstream tech) with adapted stylus
**UDL solutions that assist:**

- Providing content in digital formats
  - Allows him to access PDF’s, handouts, textbooks with trackball and voice recognition software
  - Allows him to take notes with iPad
  - Reduces the amount of writing

**Teaching strategies - what can faculty do?**

- Decrease height differential
- Schedule classes in accessible buildings and classrooms
- Provide adjustable furniture
- Allow student to take breaks

**Non-Apparent Disabilities**

- Learning disabilities
- ADD and ADHD
- Traumatic Brain Injuries
- Varied learning styles
Chris

- Undeclared major – Sophomore
- Student with a diagnosis of Dyslexia and ADD
- Has found strategies and technologies that work well from his high school experience

Barriers he experiences in accessing coursework

- Note taking – slow and laborious
- Written work – slow with handwriting and typing; loses train of thought
- Print books and handouts – unable to read efficiently due to dyslexia
- Poor quality PDF – small, faint and crowded font is hard to read
- Difficulty proof-reading his own work; dependent on family members

AT used to access coursework

- WYNN – literacy software (similar to Kurzweil 3000)
  - See and hear content simultaneously – digital books and content
  - Manipulate the display (font size, spacing, background color)
  - Electronic highlighting and annotations
  - OCR and read PDF
- Dragon Naturally Speaking – voice recognition software
  - Allows him to get ideas on paper using his voice
- Ginger
  - Proofing and sophisticated spell checking
- Live Scribe Pen
  - Synchronous written and audio notes for capturing lectures
**UDL solutions that assist:**

- Giving notes ahead of time – lets him print out content on special Livescribe paper
- Handouts in digital formats – lets him use text to speech software
- Universally designed PDF – lets him read and create annotations with Wynn or other text to speech software
- Web content with logical tab order - lets him read web content with text to speech

**Teaching strategies - what can faculty do?**

- Reinforce directions and written lecture content verbally and sequentially
- Be tolerant of lectures being recorded
- Decrease distractions and provide natural light
- Reading disability module
- Change modes of presentation/class activity
- Have student help hand out materials, etc.

**Hannah**

- Freshman student studying social work
- Recent traumatic brain injury
**Barriers she experiences in accessing coursework**

- Difficulty keeping up with note-taking
  - Trouble following lecture
- Cannot remember due dates for assignments & exams
- Fatigue with reading
  - Tracking & double vision
- Difficulty with written assignments
  - Content and mechanics
  - Challenges in navigating assignments in Blackboard

**AT used to access coursework**

- Digital recorder OR Live Scribe pen for note-taking
- Literacy support software for both reading and writing (Wynn, Kurzweil)
- Digital textbooks – Daisy format
- Smart phone apps for scheduling & reminders; recording of lectures

**UDL solutions that assist:**

- An option of different environments for exams – e.g. quiet room, extra time
- Giving lecture notes or PPT content ahead of time
- Providing all course content in digital formats - allows her to interact with content with literacy support software
- Using tools in Blackboard in a consistent manner – eases navigation
Teaching strategies - what can faculty do?

- Reinforce directions
- Allow small, frequent breaks
- Chunk information into smaller segments
- Provide distraction free room with natural lighting (reduce sensory stimuli)

Two sides of the UDL coin

Raymond

- Nontraditional student with life experience
- Studying Geology
- Owns his own mainstream mobile devices and MacBook Air
- Learning style is multi-modal
  - Likes hearing and seeing content simultaneously
  - Benefits from kinesthetic/hands-on learning

Course Materials

Students with Diverse Learning Needs

Mainstream Technologies

Usability

Students with Disabilities

Assistive Technologies

Accessibility
**Barriers he experiences in accessing coursework**

- Trouble keeping up with lecture that is primarily auditory
- Slow reader when reading textbooks
- Has a job and family that divide his attention
- Frustrated by “fluff” in course content

**Mainstream Technology used to access coursework**

- Uses an iPad to:
  - Records lectures then uses an app called audio notes to synchronize recorded lecture with written notes
  - Uses the Read to Go app for his textbooks
  - Uses an OCR app on his iPad to quickly scan content to be read later with text to speech
  - Uses calendaring features in his smart phone and iPad to update his schedule and check reminders for exams and assignments
  - Uses the built in text to speech on his MacBook Air when writing and proofing his written work

**UDL technology solutions that assist:**

- Provide lecture notes ahead of time
- Provide all handouts and other course material digitally
- Provide scanned, OCRed, PDFs
- Captioned multimedia
Teaching strategies - what can faculty do?

- Involve a variety of senses (visual, auditory, hands-on)
- Lessons need to be concrete and immediately applicable to career goals
- Honoring past experience; incorporate into teaching

Apps for Mobile Devices

- Plethora of apps that students find very useful.
- Many of these apps have some of the same features of assistive technology (low cost or free)
- Mobile devices with universal design and useful apps are decreasing the need for specialized assistive technologies.

http://atrc.colostate.edu/1quickstart-guides.aspx

Commonalities

- Provide content in flexible digital formats
- Providing lecture and other course content ahead of time
- Use LMS platforms in a consistent manner