Universal Design for Learning: From Research to Practice

Department of Occupational Therapy Research Symposium
Colorado State University
May 3, 2011

Cathy Schelly, M.Ed., OTR/L; Assistant Professor
Director, Center for Community Partnerships
PI, ACCESS Project

What I’ll cover....

- Universal Design for Learning (UDL) review
- Groundbreaking UDL research
- Relevance for OT practitioners

The ACCESS Project

- Funded by U.S. Dept. of Education, Office of Postsecondary Education
  - Grant #P333A080026
- Our Goal:
  - Ensuring that students with disabilities receive a quality education
- Our Method:
  - Universal Design for Learning (UDL) training, implementation, and research
What is Universal Design for Learning?

Universal Design (UD)

- Build in accessibility from the start
  - Curb cuts in city streets
  - Ramps and automatic door openers
  - TV closed captions
  - Ergonomic kitchen utensils
- Everyone benefits from a more flexible, accessible, and user-friendly environment

History

- Universal Design (UD)
  - Accommodate the widest spectrum of users without the need for subsequent adaptation
  - Public buildings, city streets, television, kitchen utensils, home design...
- Universal Design for Learning (UDL)
  - Inclusive pedagogy
  - Applies to both teaching and technology
Universal Design for Learning: 3 Principles

1. Instructors represent information and concepts in multiple ways (and in a variety of accessible 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.

Universal Design for Learning

An evidence-based model for curriculum design and instruction that increases access to learning for students from widely diverse backgrounds and with different learning styles.

Importance of UDL

UDL is critically important in providing fair and equal opportunities for learning for students disadvantaged by disabilities, native language, socioeconomic background, “and others who might otherwise be marginalized in the one-size-fits-all classroom.”

Revised UDL Task Force (2007)
Students in the past - how times have changed!

College students today

K-12 students today
Students are diverse

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

Disabilities

- Mobility Impairments, Physical Challenges
- Blindness/Visual Impairments
- Deafness/Hearing Impairments
- Learning Disabilities
- Attention Deficit Disorder (ADD/ADHD)
- Autism Spectrum Disorder
- Traumatic Brain Injury (TBI)
- Intellectual Disabilities
- Mental Illness

Disabilities in Higher Education

- Nationally, 11.3% of undergraduates report some type of disability
- At Colorado State University
  - 8%–11% report a disability
  - Non-apparent disabilities are by far the largest proportion (2/3) and growing
  - Even among students who say they have a disability, many do not seek accommodations – makes the case for UDL implementation!
UDL: Designing learning goals, activities and environments

- The key to designing learning goals, activities, and environments to meet the needs of many kinds of learners is to provide flexibility in:
  - how information is presented
  - how learners express and demonstrate their knowledge
  - how students engage with the learning process

UDL Research

Purpose of Project Research

- Investigate the number of students who report having a disability and the percentage who seek accommodations
- Examine the effectiveness of instructor UDL training as measured by student and instructor perceptions.
  - Examine perceptions regarding what promotes an effective teaching and learning environment
- Lay groundwork to monitor persistence and retention
First Intervention
Effectiveness Study

- First intervention effectiveness study – only experimental group
  - 9 sections of Intro to Psychology
  - 5 instructors
  - 1,615 students enrolled; 1,362 students filled out the pre-questionnaire and 1,223 students filled out post-questionnaire

Procedure: First Intervention
Effectiveness Study

- Pre-questionnaires given to instructors and students early in the semester, in class
  - Student questionnaires administered in class – 27 questions
  - Data used to tailor training to instructor needs re: UDL
- Instructors participated in UDL training for five one-hour sessions during the semester
- Instructors then implemented UDL strategies in their courses
- Post-questionnaires administered at the end of the semester, again in class

Results: First Intervention
Effectiveness Study

- Statistically significant, meaningful effect sizes (student perspective):
  - Information is presented in multiple formats
  - Instructors provide electronic equivalents of paper handouts
  - Instructors made the key points in videos significantly more apparent to the students after training
  - Instructors supplemented significantly more of the lecture and reading materials with visual aids following the UDL training
Refining Questionnaires in preparation for second intervention effectiveness study

- Changed scale from 5 point to 10 point scale to address ceiling effects
- Added additional questions to better address three UDL principles, going from 27 to 52 questions
- Length of new questionnaire prohibitive for in-class completion, so designed to be delivered via WebCT

Second Intervention Effectiveness Study

- Experimental group
  - 9 sections of Psychology courses, 6 instructors
  - 1,164 students enrolled; 622 students filled out the pre-questionnaire and 421 students filled out post-questionnaire

- Control group
  - 646 students enrolled; 276 students filled out the pre-questionnaire and 223 students filled out post-questionnaire

Procedure: Second Intervention Effectiveness Study

**Experimental Group**

- Pre-questionnaires given to instructors and students early in the semester
  - Student questionnaires administered through WebCT – 52 questions
  - Data used to tailor UDL training to instructor needs
- Instructors participated in UDL training for five one-hour sessions during the semester
- Instructors then implemented UDL strategies in their courses
- Post-questionnaires administered at the end of the semester
**Procedure: Second Intervention Effectiveness Study**

Control Group (same semester, one year later)
- Pre-questionnaires given to students early in the semester
  - Student questionnaires administered through WebCT – same 52 questions
- No UDL training provided for instructors
- Post-questionnaires administered at the end of the semester to students and instructors

**Students Demographics: With and without Disabilities**

- Experimental group – 9 courses
  - Pre-questionnaire
    - 9.3% reported having a disability
  - Post-questionnaire
    - 10.3% students reported having a disability
- Control group – 6 courses
  - Pre-questionnaire
    - 9.5% reported having a disability
  - Post-questionnaire
    - 6.1% students reported having a disability

**Students with disabilities seeking or not seeking accommodations**

- Experimental group
  - Pre-questionnaire
    - 37% contacted Resources for Disabled Students (RDS)
  - Post-questionnaire
    - 40% had contacted RDS
- Control group
  - Pre-questionnaire
    - 37.9% contacted RDS
  - Post-questionnaire
    - 35.7% had contacted
Results: Second Intervention
Effectiveness Study, Experimental Group

Quantitative - Statistically significant, meaningful effect sizes (student perspective)
- Information is presented in multiple formats
  \( t_{(385)} = 3.68, \ p < .0001, \ d = .20 \)
- Instructor actively engages students in learning
  \( t_{(385)} = 5.24, \ p < .0001, \ d = .26 \)
- Instructor relates key concepts to the larger objectives of the course
  \( t_{(385)} = 5.03, \ p < .0001, \ d = .28 \)
- Instructor begins class with an outline
  \( t_{(385)} = 8.15, \ p < .0001, \ d = .39 \)
- Instructor summarizes key points
  \( t_{(385)} = 4.07, \ p < .0001, \ d = .21 \)
- Instructor highlights key points of instructional videos
  \( t_{(385)} = 3.71, \ p < .0001, \ d = .20 \)

Strategies to Increase Student Engagement, Expression
- \( i \)-clicker questions
- Asks questions
- Videos
- Partner/group discussion and activities
- In-class mini writing assignments

Strategies to Increase and Support Learning
- Videos
- Provides examples
- \( i \)-clicker questions
- PowerPoint (format, structure, organization)
- Checks/teaches for understanding

Effectiveness of UDL Training compared to control group
Effectiveness of UDL Training compared to control group

Investigate the number of students who report having a disability and the percentage who seek accommodations.

Examine the effectiveness of instructor UDL training as measured by student (and instructor) perceptions.

Examine perceptions regarding what promotes an effective teaching and learning environment.

Lay groundwork to monitor persistence and retention.

Revisiting Purpose of ACCESS UDL Research
**Monitoring persistence**

- With these data, we have been able to answer two questions related to persistence:
  - Do students with disabilities demonstrate more difficulty with persistence than students without disabilities?
  - Do students with disabilities who are in classes that utilize UDL exhibit better persistence than students with disabilities in control classes where UDL is not being utilized?

**Persistence: Comparing students without disabilities and students with disabilities**

- Students with disabilities displayed significantly poorer persistence than students without disabilities ($\chi^2 = 3.844, p = .025$)
  - Total number of students = 888
    - Without disabilities = 815
    - With disabilities = 73
  - Students that did not complete the course
    - Without disabilities = 29 (3.6%)
    - With disabilities = 6 (8.2%)

**UDL Instructor Training Impacts Persistence**

- Students with disabilities demonstrate significantly better persistence in courses using UDL when compared to students with disabilities in courses that do not employ UDL ($\chi^2 = 3.05, p = .04$)
Research Discussion

- Examine the effectiveness of instructor UDL training
  - Just a few hours of training can produce significant changes in instructor teaching behavior, compared to a control group that did not receive UDL training
- Number of students who report having a disability
  - Corroboration of national disability statistics (9-11%), with only 35 – 40% seeking accommodations
- Perceptions regarding what promotes an effective teaching and learning environment
  - Multiple modes of representation, expression and engagement
- Monitor persistence
  - Students with disabilities demonstrate significantly higher persistence in UDL courses, compared to control courses

Does this apply to K-12 for OT Practitioners?

- UDL, an inclusive, universal approach to instruction in K-12 enables greater collaboration between educators and occupational therapy practitioners.
- K-12 OT practitioners skilled in:
  - Recognizing the needs of individual students
  - Modifying classrooms and activities to increase engagement and participation in classroom and school activities
  - Suggesting individualized approaches to learning that best suit a child's strengths and needs

Students in general education

Almost half of the more than 6 million students served under IDEA spend at least 80% of the school day in general education classes!

Individual with Disabilities Education Improvement Act of 2004 (P.L. 108-446)
Public Policy

IDEA (2004) supports a new and important role for occupational therapy practitioners in schools as:
- Direct and consultative service providers
- Partners and collaborators with educators

Individuals with Disabilities Education Improvement Act of 2004, P.L. 108-446.

OT + UDL = Accessible Education for all students

As occupational therapists, we know a great deal about multisensory learning, and we have the opportunity to work closely with educators to suggest creative methods for presenting information to students with diverse ways of taking in and understanding information.

Otis & Salaska (2011)
Multiple modes of representation

- Post-class notes online prior to class
- Present information in multiple ways/formats (hands-on exercises, text + graphics, audio, video; usable electronic formats (Word, PDF, HTML)
- Shifting between spoken, written and hands-on information
- Changing the appearance of written text on a screen
- Using specialized software to read text aloud
- Using visual-motor or tactile cueing strategies to provide appropriate somatosensory input
- Look at lighting, sound, and other aspects of the learning environment to help a teacher highlight relevant information and reduce distractions

Occupational therapists guiding teachers in UDL implementation:

Multiple modes of expression

- An occupational therapy practitioner’s unique skills in activity analysis are useful not just in working with one child, but in helping teachers:
  - plan a classroom approach to breaking information and tasks down into smaller, more manageable steps;
  - balancing the interaction between listening and doing so that students practice new skills enough to learn them well; and
  - providing the most effective timing and types of feedback during learning and expression.

Multiple modes of expression

- Provide flexibility in assessment and exams
  - Express learning in writing, electronically, by demonstration, through hands-on activities, through verbal explanation and description, through special projects, portfolios, journals
  - Make a wide variety of writing utensils, including technology, available for ALL students
  - Use of images, voice recognition, etc.
- Encourage alternative formats for assignments
  - Multimedia (text/graphics/audio/video)
- Encourage electronic communication
  - Face-to-face or in-class communication can be difficult and stressful
ALL students are drawn to technology - use this universal appeal to promote expression from students with and without disabilities

"There aren't any ions to click. It's a chalk board."

"How do you expect me to write with that? It doesn't even have a USB port for a keyboard!"

Occupational therapists guiding teachers in UDL implementation: Multiple opportunities for engagement

- Students respond to the world around them and engage in learning in ways that are complex and unique, affected by both prior experiences and how they process sensory information.
- OTs can work within a classroom or participate in school-wide efforts to increase awareness of and enhance students' social and emotional responses to and engagement in learning activities, lunch, recess, transitioning from class to class, etc.

Multiple opportunities for engagement

- Communicate high expectations for all learners
- Invite students verbally and in writing, to speak to you privately if they have learning challenges, promoting self-advocacy
- Ask students where they'd like to sit, promoting participation and engagement
- Challenge students with meaningful, real-world and applicable assignments and activities that put learning into context and promote engagement and excitement for learning
- Consider using classroom response systems (i>clickers)
Our hope, our dream....

We hope that many of the students you are supporting individually and by consulting with their teachers regarding the benefits of UDL will graduate from high school and come to CSU, FRCC or some other Institution of Higher Education!

When they do, we hope to be fully implementing UDL, we hope these students will be strong self-advocates, and we plan on them being successful in their postsecondary pursuits!

Implications for Occupational Therapy Practitioners

As occupational therapists, we have the opportunity to become experts in UDL implementation in K-12 and postsecondary education through reading, coursework, networking and continuing education!

Through UDL implementation, the benefits are universal – for our students – with and without disabilities, their instructors, the mainstream movement, and our profession!

In summary

UDL + OT = Accessible Education for ALL Students
The ACCESS Project, Colorado State University
Funded by U.S. Dept. of Education, Office of Postsecondary Education
Grant #P333A080026

Thank you!
accessproject.colostate.edu

References


Higher Education Opportunity Act, P. L. 110‐315

Individuals with Disabilities Education Improvement Act of 2004. P. L. 108‐446


