CAST | Until learning has no limits™

Universal Design for Learning

Universal Design for Learning in Postsecondary Education

May 14, 2015

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CAST & UDL

CAST is an education research and development nonprofit that leverages science and technology to create products, promote practices, and inform policies that expand learning opportunities.

Universal Design for Learning (UDL) is a framework to improve and optimize teaching and learning for all people based on scientific insights into how humans learn.

We consider students at the margins from the outset because innovations that are essential to some end up being beneficial to many.

Outline

1. The access/retention problem in postsecondary
2. UDL as a research-based framework for addressing learner variability, equitable access and equitable progress
3. Implementation of UDL in curricula and institutional policies & practices

A changing landscape

- One million associates degrees granted in 2011-2012 (71% increase since 2001-2002)
- 11% of undergraduates in 2007–08 reported having a disability
- Enrollment of students who are 25 to 34 years old increased 45% between 1996 and 2010; and is projected to increase 20% between 2010 and 2021.

Student success and persistence (Tinto, 2012)

(1) high expectations and self-expectations
- impacted by the beliefs of faculty and staff, as well as institutional policies and culture

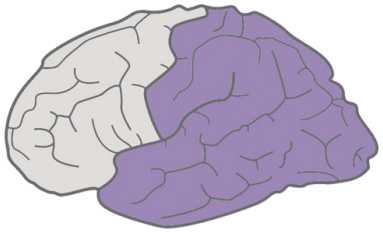
(2) academic and social support
- to enable students to meet high expectations

(3) assessment and feedback
- formative assessment of student progress that informs instruction and support

(4) Interaction/engagement in social and academic processes
- Inclusive of faculty, student peers, and staff

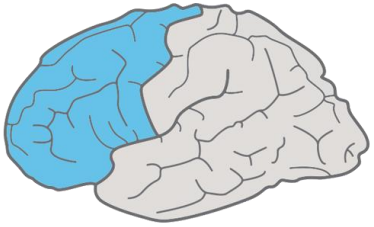
Three Learning Networks

RECOGNITION NETWORKS:
THE **WHAT** OF LEARNING



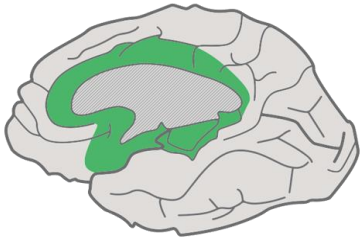
For resourceful, knowledgeable learners, present information and content in different ways

STRATEGIC NETWORKS:
THE **HOW** OF LEARNING



For strategic, goal-directed learners, differentiate the ways that students can express what they know

AFFECTIVE NETWORKS:
THE **WHY** OF LEARNING



For purposeful, motivated learners, stimulate interest and motivation for learning.

UDL Guidelines

I. Provide Multiple Means of **Representation**

1: Provide options for perception

1.1 Offer ways of customizing the display of information

1.2 Offer alternatives for auditory information

1.3 Offer alternatives for visual information

2: Provide options for language, mathematical expressions, and symbols

2.1 Clarify vocabulary and symbols

2.2 Clarify syntax and structure

2.3 Support decoding of text, mathematical notation, and symbols

2.4 Promote understanding across languages

2.5 Illustrate through multiple media

3: Provide options for comprehension

3.1 Activate or supply background knowledge

3.2. Highlight patterns, critical features, big ideas, and relationships

3.3 Guide information processing, visualization, and manipulation

3.4 Maximize transfer and generalization

Resourceful, knowledgeable learners

II. Provide Multiple Means of **Action and Expression**

4: Provide options for physical action

4.1 Vary the methods for response and navigation

4.2 Optimize access to tools and assistive technologies

5: Provide options for expression and communication

5.1 Use multiple media for communication

5.2 Use multiple tools for construction and composition

5.3 Build fluencies with graduated levels of support for practice and performance

6: Provide options for executive functions

6.1 Guide appropriate goal-setting

6.2 Support planning and strategy development

6.3 Facilitate managing information and resources

6.4 Enhance capacity for monitoring progress

Strategic, goal-directed learners

III. Provide Multiple Means of **Engagement**

7: Provide options for recruiting interest

7.1 Optimize individual choice and autonomy

7.2 Optimize relevance, value, and authenticity

7.3 Minimize threats and distractions

8: Provide options for sustaining effort and persistence

8.1 Heighten salience of goals and objectives

8.2 Vary demands and resources to optimize challenge

8.3 Foster collaboration and community

8.4 Increase mastery-oriented feedback

9: Provide options for self-regulation

9.1 Promote expectations and beliefs that optimize motivation

9.2 Facilitate personal coping skills and strategies

9.3 Develop self-assessment and reflection

Purposeful, motivated learners

CAST

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Think across the principles, too

1. Accessibility
2. Making information meaningful
3. Independent, self-directed learners

Settlement agreement between the US Dept. of Justice and EDX Inc.

- www.edx.org, its mobile applications, and the LMS conform with, at minimum, the Web Content Accessibility Guidelines ("WCAG") 2.0 AA
- Ensure compatibility with any accessibility features in course content (e.g, MathML)
- Hire an accessibility consultant and conduct annual accessibility audits
- Develop guidance and training for content providers

UDL in Federal Policy and Grants

- Higher Education Opportunity Act of 2008 definition
  - "The term 'universal design for learning' means a scientifically valid framework for guiding educational practice that – A) provides flexibility … and B) reduces barriers in instruction… and maintains high achievement expectations for all students"
- Trade Adjustment Assistance Community College and Career Training (TAACCCT) Grant Program is a $2 billion investment that specifically requires UDL in the SGA:
  - –All online and technology-enabled content and courses developed under this SGA must incorporate the principles of universal design (see http://www.cast.org/udl/) in order to ensure that they are readily accessible to qualified individuals with disabilities

UDL Implementation: Curriculum

Goals

- Clear goals are the cornerstone of effective curricula

Materials

Methods

Assessment

Goals Without Embedded Means

UDL Implementation: Curriculum

Goals

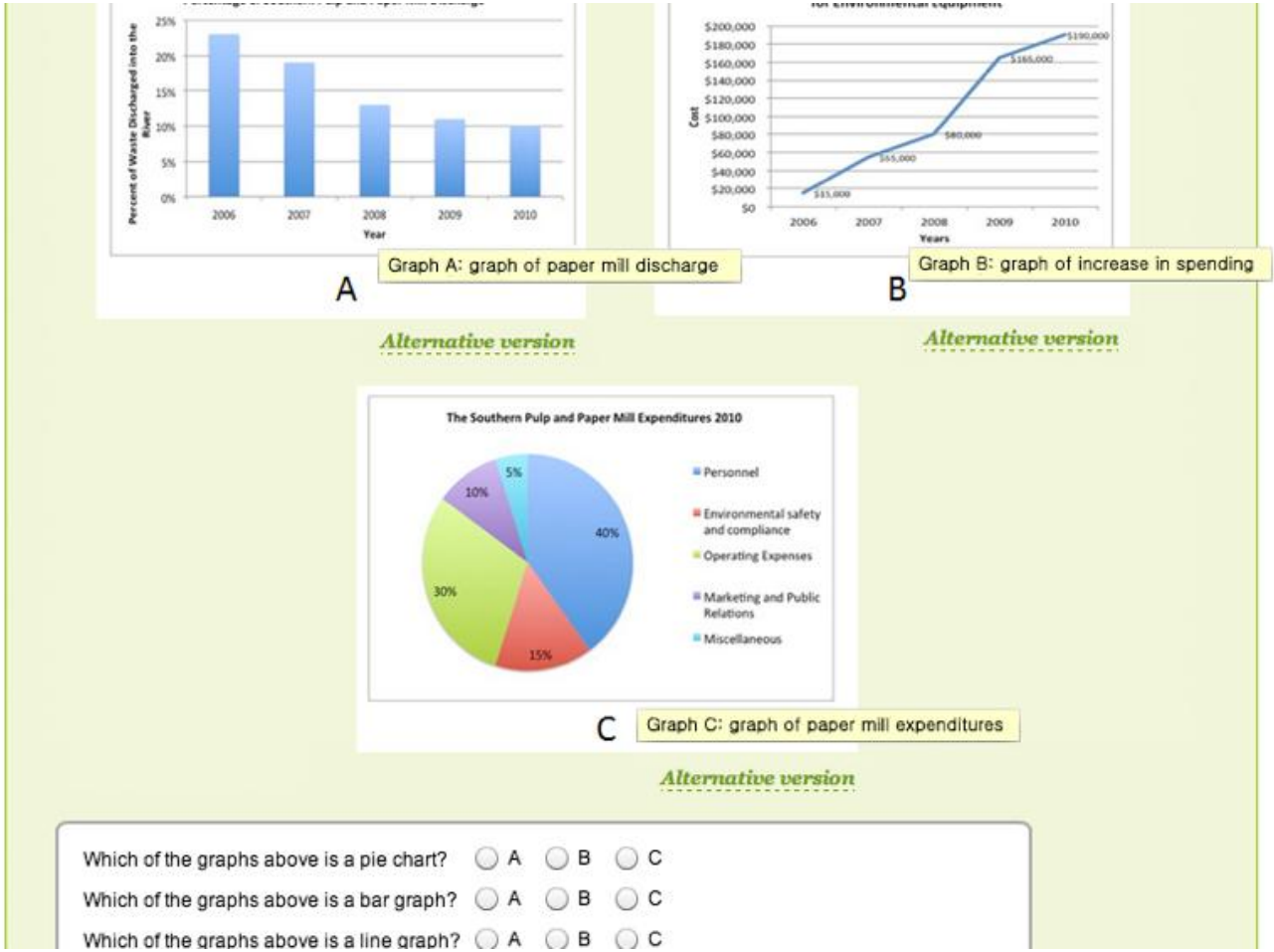
Materials

- Embed options to ensure accessibility of all materials, media and technology; Support decoding text, mathematical notation, and symbols. Promote understanding across languages.

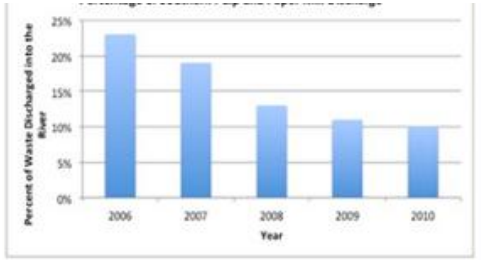
Methods

Assessment

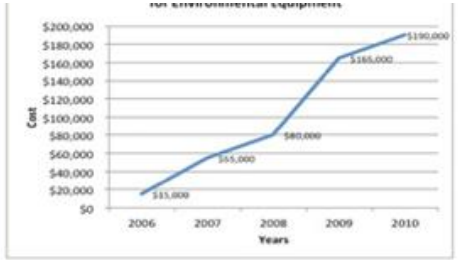
Accessible Images with Alt Text…



…and long descriptions.



A



B

Alternative version

The title of this graph is: Percentage of Sounthern Pulp and Paper Mill Discharge. The X-axis (horizontal bottom line) is labeled "Year", and the Y-axis (vertical left line) is labeled "Percent Reductions". There are five rectangular bars decreasing in size from left to right. The data indicates that the paper mill reduced discharge of chemicals from about 23% in 2006 to 10% in 2010.

C

Alternative version

The title of this graph is: Southern Pulp and Paper Mill: Increase in Spending for Environmental Equipment. The X-axis (horizontal bottom line) is labeled "Years", and the Y-axis (vertical left line) is labeled "Cost". A line starts at the lower left corner of the graph and rises upward to the right, ending near the upper right corner of the graph. The data shows that there was an increase in spending from rom $15,000 in 2006 to $190,000 in 2010.

Alternative version

The title of this graph is: The Southern Pulp and Paper Mill Expenditures 2010. The graph is a circle with labeled slices of varying sizes. This data shows the percent of the total amount of money that was spent on each of the

Which of the graphs above is a pie chart? ◯ A ◯ B ◯ C

Which of the graphs above is a bar graph? ◯ A ◯ B ◯ C

Which of the graphs above is a line graph? ◯ A ◯ B ◯ C

Provide Options for Language, Mathematical Expressions, and Symbols

2. For each fraction, multiply the denominator by a number that will result in the lowest common denominator.

$$\frac{1}{3} \times 2 = 6$$

$$\frac{1}{6}$$

Fraction already has LCD
does not get changed

Alternative version

UDL Implementation: Curriculum

Goals

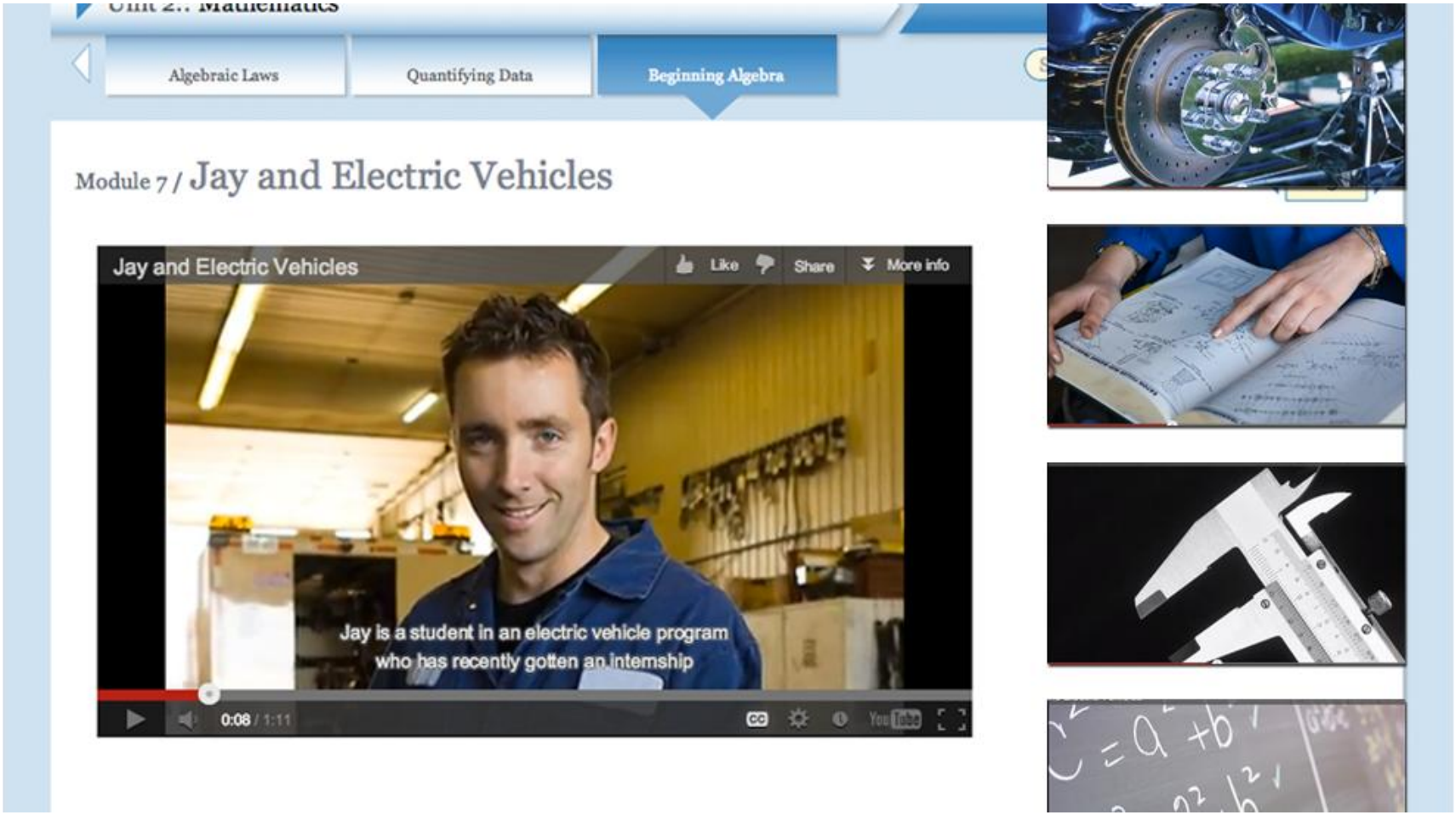
Materials

Methods

- Select teaching approaches that consider learner variability while maintaining the expectation that all individuals achieve learning goals

Assessment

Using Case-Based Teaching Approaches



CollegeSTAR Tutoring

- College STAR (*Supporting Transition, Access, and Retention: A UNC System Project Supporting Students with Learning Differences*)
- Tutors, trained in UDL, gave live and online recorded tutoring sessions and gave professor feedback on how UDL her/his course was
- Program aided in retention of STEM courses with high enrollment and low course passage rates

UDL Curriculum: Assessment

Goals

Materials

Methods

Assessment

- When there is a single form of assessment where the means are fixed, ensure Universal Design of Assessment.
- Ensure learners have options in how they can demonstrate what they know. Options should be tied to learning goals.

UDL Representation, but not Assessment

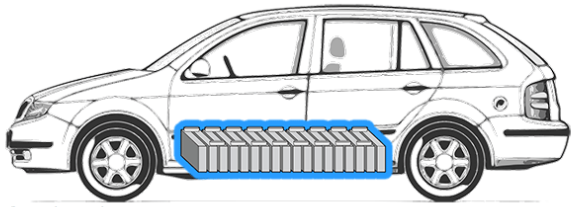
The first day on the job Janet and Jay begin to discuss the benefits of electric vehicles over gas powered vehicles.

Jay indicates, "I think that the fact that the electric cars are much better for the environment is great, but most of them don't have as much power compared to gas powered cars. Is there anything that can be done to make them have more power?"

Janet explains to Jay that the car gets its power from the battery cells. The more cells in a car, the more power it will have.

"So why don't they just put more cells into the cars they are making now to give them more power?" Jay responds.

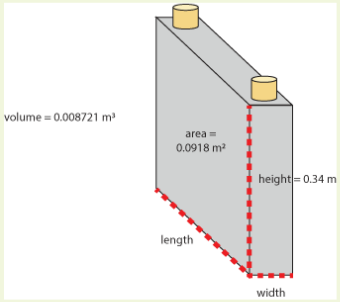
"I'm glad you asked that Jay. Because the assignment I'm working on is related to that. Several factors that are considered when determining how many battery cells go in a car are the weight of the batteries, their cost and how they will physically fit into the car. You see the cells are quite heavy and very expensive." Janet tells Jay.



Alternative version

did I get this

Jay they have also given us incomplete dimensions on the individual cells within the battery pack. Take a look at this diagram and the information given. Can you calculate the length and height for the individual cell, so we have a complete listing of all the dimensions to be considered?



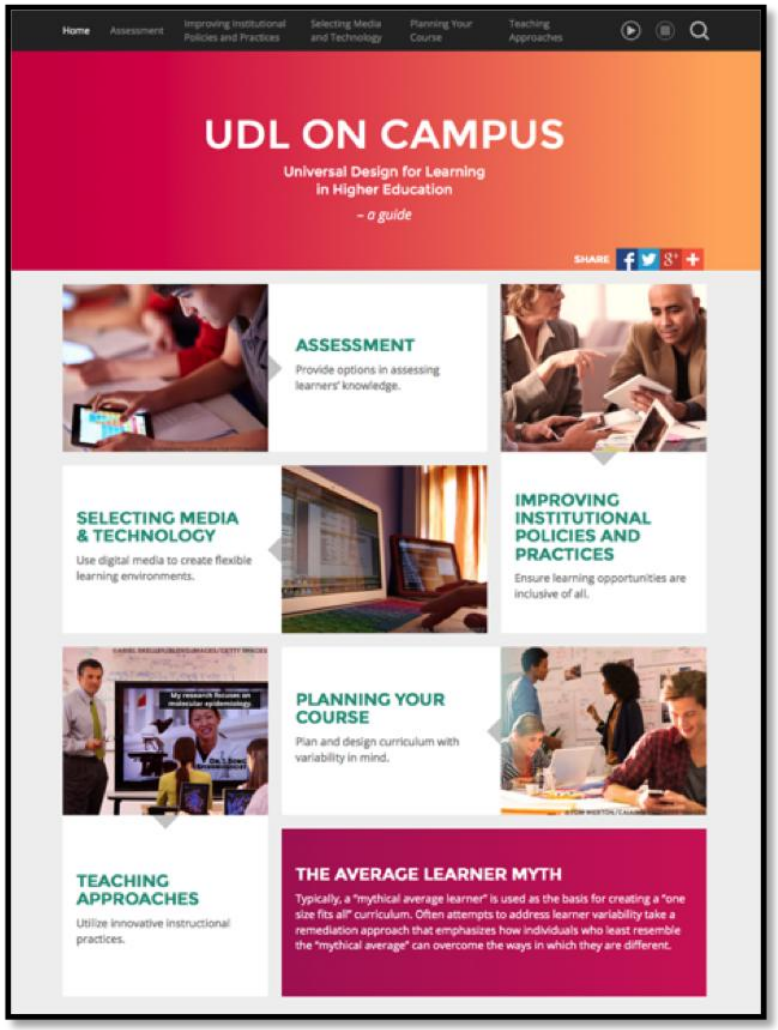
Alternative version

What is the length of of the battery cell as seen on the diagram?

○ 3.70 m ○ 0.27 m ○ 0.031 m

What is the height of the battery cell? ○ 0.011 m ○ 0.00080 m ○ 10.53 m ○ 0.095 m

Resources, Partnerships, Dissemination



CAST's new website on UDL in higher education is UDLOnCampus.cast.org

Resources on:

- Assessment
- Selecting Media and Technology
- Institutional Policies and Practices
- Planning your Course
- Teaching Approaches

References

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http://www.dol.gov/apprenticeship/grants.htm -- American Apprenticeship Initiative

CollegeSTAR initiative https://www.collegestar.org/

National Education Technology Plan

http://tech.ed.gov/netp/

http://www.doleta.gov/taaccct/

http://www.doleta.gov/oa/aag.cfm

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Settlement Agreement between the United States of America and EdX Inc. Under the Americans with Disabilities Act DJ No.202-36-255 http://www.justice.gov/sites/default/files/opa/press-releases/attachments/2015/04/02/edx_settlement_agreement.pdf

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Questions & Suggestions

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