Technology and Tools to Support Classroom Instruction for Secondary Students with Autism Spectrum Disorders

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The Challenge

- Access, participation, and progress in the general education curriculum for all learners - IDEA ‘97

- Each state needs to have challenging academic standards for all schools and children in the state - No Child Left Behind 2001
UD Origin and Definitions

Drawbacks of Retrofitting

• Each retrofit solves only one local problem
• Retrofitting can be costly
• Many retrofits are UGLY!
“Consider the needs of the broadest possible range of users from the beginning”

Architect, Ron Mace
Architectural Universal Design principles

- Equitable Use - The design is useful and marketable to people with diverse abilities - same means for all users

- Flexibility in Use - The design accommodates a wide range of individual preferences and abilities

- Simple and intuitive - Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level
Architectural Universal Design principles

- Perceptible Information - The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities

- Tolerance for Error - The design minimizes hazards and the adverse consequences of accidental or unintended actions

- Low Physical Effort - The design can be used efficiently and comfortably and with a minimum of fatigue

- Size and Space for Approach and Use - Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility
Educational Application

- Equitable Curriculum - uses a single curriculum that is accessible to students with diverse abilities
- Flexible Curriculum - considers physical and sensory-motor disabilities as well as learning preferences
- Simple and Intuitive Instruction - provided in mode most accessible to students; ongoing monitoring of student progress
- Multiple means of representation - multiple ways to teach
Educational Application

- Success-oriented curriculum - engagement encouraged by removing barriers; learning is scaffolded and supportive
- Appropriate level of student effort - ease of access to materials, promotes comfort, addresses motivation
- Appropriate environment for learning - environment and organization allows for variations in physical and cognitive access to materials and learning
Universal Design

- Not one size fits all – but alternatives.
- Designed from the beginning, not added on later.
- Increases access opportunities for everyone
CAST believes that “barriers to learning are not, in fact, inherent in the capacities of learners, but instead arise in learners' interactions with inflexible educational goals, materials, methods, and assessments.”

*Teaching Every Student in the Digital Age, p. vi*
Universal Design for Learning

Shift in focus:

Not in changing the student but in changing the curriculum

goals

methods

assessments

materials
Definition:
UDL is an educational approach to teaching, learning, and assessment, drawing on new brain research and new media technologies to respond to individual learner differences.

- UDL provides equal access to learning and not just information
- Academic challenges are not removed but barriers to access are
UDL and the Learning Brain

- Recognition network
- Strategic network
- Affective network

Each person’s brain functions in roughly the same way but each person has their own pattern of activity. Some individuals have larger regions for recognizing patterns or for solving problems.
Recognition networks: “the what of learning”
identify and interpret patterns of sound, light, taste, smell, and touch

In learning, recognition networks work to identify letters, formulas, maps, ideas, cause/effect, opposites, etc.
To support recognition networks:

Provide varied and flexible methods of presentation
- give learners various ways to acquire information and knowledge

Provide multiple examples
Highlight critical features
Provide multiple media and formats
Support background context

Teaching Every Student in the Digital Age, p. 109
Strategic networks: “the how of learning”
plan, execute, and monitor actions and skills

In learning, strategic networks are critical for doing a project, taking a test, listening to a lecture, learn to read, write, solve problems and plan/execute compositions projects.
To support strategic networks:

- Provide multiple pathways for reaching goals; offer students alternatives for developing skills and demonstrating what they know
  - Provide flexible models of skilled performance
  - Provide opportunities to practice with supports
  - Provide ongoing, relevant feedback
  - Offer flexible opportunities for demonstrating skill
In learning, affective networks are essential to wanting to learn. It influences motivation to learn. It is responsible for developing preferences and establishing priorities and interests.
Provide multiple means for engagement in order to help learners get interested, challenged and motivated.

- Offer choices of content and tools
- Offer adjustable levels of challenge
- Offer choices of rewards
- Offer choices of learning contexts
One must recognize information, ideas, and concepts

One must be able to apply strategies to process the information

One must be engaged

Vygotsky
All learners are unique and universal does not mean “one size fits all”
Now what?

- How does the learning brain impact curriculum design?
  - Multiple means of representation to support recognition learning
  - Multiple means of expression to support strategic learning
  - Multiple means of engagement to support affective learning
Multiple Means of Representation

- Provide multiple examples and non-examples
- Point out critical features of a new idea, pattern or concept
- Present in many formats and media
Multiple Means of Expression

- Multiple ways to learn new strategies & demonstrate skilled performance
- Ongoing relevant feedback - embedded instructional strategies within digital versions of text
Multiple Means of Engagement

- Motivation
- Interest
- Engagement
- Desire
- Curiosity
- Preference
Principles of UDL are enabled by:

- Appropriate goals for learning and performance (separate means from the goal)
- Flexible and supportive digital materials usable with new electronic tools for access & learning
- Flexible and diverse methods while applying appropriate challenges & support
- Accessible & flexible assessments that measure what needs to be measured
Characteristics of ASD

- Communication
- Social
- Restricted repetitive & stereotyped patterns of behaviors, interests, and activities
Other Common Characteristics of ASD

- Generalization - trouble applying information and skills across settings and people
- Rote memory - while an asset, can be troublesome; others perceive that the individual has a higher degree of comprehension; can repeat steps to a problem but have problems with performance
- Visual - an area of strength for many individuals with ASD
Concrete/literal - have trouble with figurative language, metaphors, jokes, sarcastic language
Theory of Mind

* The ability to understand the mental states of others and apply this understanding to predict the actions of others; the ability to think about other people’s thinking, and think about what they think about our thinking

* **Mindblindness**: difficulty recognizing the feelings and thoughts of others;

Theory of Mind

–This deficit area appears as:
  • Unable to explain own behaviors
  • Difficulty understanding emotions
  • Problems with understanding perspective of others
  • Problems inferring intentions of others
  • Lack understanding in how behavior impacts others thinking and/or feelings
  • Difficult differentiating fact from fiction
  • Difficulty understanding the hidden curriculum (those rules we learn without being explicitly taught)

By age 4, children understand that other people have thoughts, knowledge, beliefs and desires of their own.
Weak Central Coherence

✗ Limited ability to understand the larger context or to "see the big picture"

✗ Trouble understanding the gist of the story or with grasping the underlying theme/intent of a message

✗ The ability to see the parts over the whole

✗ The individual “may notice every single tree in the forest, while the NT (neurotypical) person will focus on the forest.” (Dr. Ortiz, presentation, 2006)

✗ Presents as problems with flexible thinking and understanding of social situations
WAP WAP WAP

CALVIN! WHAT ARE YOU DOING TO THE COFFEE TABLE?!?

IS THIS SOME SORT OF TRICK QUESTION, OR WHAT?
Executive Functioning

- Trouble with planning, organizing, shifting attention, and multitasking
  - Show difficulties in completing complex tasks
  - May complete work - but can’t find it to turn it in
  - May have trouble taking notes and listening to teacher
    - Donna Williams - I can look at you or listen to you, I can’t do both.
  - Need to finish one task before beginning another
  - Unable to leave a task if it is not finished
    - Larry Bissonette, artist with ASD - I am wired for finished.
Executive Functioning

This deficit areas appears as:

- Slow processing speed
- Concrete interpretation
- Difficulty with “if-then” thinking
- Overwhelmed by a heavy work load
- May see all details as equally important
- Rigid & perfectionistic
- Prefer step-by-step, sequential learning
Sensory Integration - Common area of difficulty for many individuals on the ASD spectrum

- It is a neurological process – the ability for a person to be able to “sense” information from the environment, receive/register, screen and filter this information, interpret, organize and integrate it to be able to respond with appropriate behavior, meaningful participation and to be able to function.

- Dr. Jean Ayers (1979), defined sensory integration as “the organization of sensation for use.”

- It is a constant, ongoing, dynamic process that starts developing before birth and occurs continuously.
Diner Menu – Photosynthesis

**Appetizer (Everyone Shares)**
- Write the chemical equation for photosynthesis.

**Entrée (Select One)**
- Draw a picture that shows what happens during photosynthesis.
- Write two paragraphs about what happens during photosynthesis.
- Create a rap that explains what happens during photosynthesis.

**Side Dishes (Select at Least Two)**
- Define respiration, in writing.
- Compare photosynthesis to respiration using a Venn Diagram.
- Write a journal entry from the point of view of a green plant.
- With a partner, create and perform a skit that shows the differences between photosynthesis and respiration.

**Dessert (Optional)**
- Create a test to assess the teacher’s knowledge of photosynthesis.
## THINK-TAC-TOE

### Book Report

<table>
<thead>
<tr>
<th>Draw a picture of the main character.</th>
<th>Perform a play that shows the conclusion of a story.</th>
<th>Write a song about one of the main events.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write a poem about two main events in the story.</td>
<td>Make a poster that shows the order of events in the story.</td>
<td>Dress up as your favorite character and perform a speech telling who you are.</td>
</tr>
<tr>
<td>Create a Venn diagram comparing and contrasting the introduction to the closing.</td>
<td>Write two paragraphs about the main character.</td>
<td>Write two paragraphs about the setting.</td>
</tr>
</tbody>
</table>
Presents information through text, sound, and images.

It is flexible and can meet the needs of diverse learning styles.

It is versatile - can be displayed in multiple formats.

It is transformable - font, size, color, etc.

It has the ability to be marked, and the ability to be networked.
Let’s explore some tools

http://udl-vt-ttac.wikidot.com
UDL and Graphic Organizers

- Supports recognition networks through use of color, symbols and links
- Supports strategic network by scaffolding learning
- Supports affective network by engaging learners through digital images
Let’s explore some tools

http://udl-vt-ttac.wikidot.com
UDL and Text-to-Speech

- Additional flexibility and accessibility added to digital media
- Makes text audible
- Provides synchronized highlighting of letter, words, sentences and paragraphs
Let’s explore some tools

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http://udl-vt-ttac.wikidot.com
For more info on UDL and technology links, visit http://udl-vt-ttac.wikidot.com/.


www.k8accesscenter.org

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