VRAILEXIA

Partnering Outside the Box: Digital and Artificial Intelligence Integrated Tools to Support Higher Education Students with Dyslexia

7rd April 2022

www.vrailexia.eu

ToT: Training of Trainers

Department of Philosophy, Social Sciences, Humanities and Education

University of Perugia

Annalisa Morganti, Ph.D.

Claudia Mazzeschi, Director of Department

Elisa Delvecchio, Ph.D.

Moira Sannipoli, Ph.D.

Agenda of first session

- Starting activity

- Accessibility and neurodiversity

- Universal Design

- Universal Design of Learning – UDL

- Three key principles of UDL

- Workshop session

Starting Acvity: Make Toast

What have we learned from this activity?

- *Everyone has their own way of thinking*

- *Everyone has their own way of solving problems*

- *Everyone needs to adapt your own thinking to that of others when working together*

What do we know about "accessibility"?

- The characteristic of a device, service, resource or environment to be easily usable by any type of user.

- Key factor for inclusion.

- It can take on different connotations depending on the contexts in which it is used.

Universal Design

"Accessibility" of buildings:

"Universal Design"

○ *1980s, Ronald L. Mace* ⟶ *Designing products and environments that are useful for everyone but indispensable for some without the need for special adaptations or aids.* *(CAST, 2018)*

○ *A modern, wide-ranging design methodology with the fundamental objective of designing and implementing buildings, products and environments that are in themselves accessible to all categories of people.*

○ *An example of a universal design is the kerbside slide. Although it was originally designed for people in wheelchairs, it is now used by everyone from people with shopping trolleys to parents with pushchairs.*

UNIVERSAL DESIGN

Making design accessible to everyone in society

Universal Design of Learning - UDL

"Accessibility" in educational contexts

- Learning implies a specific change in the concrete area in which it occurs.

- Unnecessary barriers must be removed without eliminating necessary changes.

- Access to all areas of learning.

- Active individual and protagonist of his own development

- Ability to experience is the basis for building knowledge.

- Educator as a builder of opportunities to learn.

- In educational spaces, it allows the autonomy of the student, offers both accessible corners and materials, mostly at his/her disposal, without the constant mediation of the adult.

- An essential characteristic of accessibility is the absence of significant barriers, the safety of buildings, furniture and materials.

Neurodiversity...

There is no single right way to receive, process or express knowledge

Agency: Students + Instructor co-create a learning moment by using various modalities and format information reception, processing and expression by:

- **Anticipating** the needs of a diverse audience and proactively building in features to accommodate that diversity

- **Modifying** the environment in ways that engage and benefit all participants

- **Expanding** the playing field by removing any limitations and unnecessary barriers

From "Universal Design" to "Universal Design for Learning" (UDL)

The American research group **CAST** (Center for Applied Special Technology) has extended the "Universal Design" movement in pedagogy and education to make existing curricula more accessible and cater for individual student variability through flexible objectives and inclusive assessment methods, materials and processes.

(CAST, 2018)

Pedagogical reference model that aims to guide educational practice by identifying and removing obstacles in curricular teaching materials to address the variety of students' needs.

Universal Design for Learning" (UDL)

❖ *Designing teaching materials and methods that can be used by a wide range of learners.*

❖ *Individual learning patterns differ and learning systems should accommodate variability among learners from the outset.*

❖ *Flexible conditions that ensure access and participation for all learners, without lowering expectations or standards.*

❖ *UDL design principles take a holistic approach to learning in which front office staff, orientation, professors and the university approach work together to support the needs of all students. UDL provides them with detailed implementation resources: research-based guidelines, specific discussions and recommendations for setting learning objectives, materials, methods, assessments and policies. (CAST, 2018)*

❖ *UDL-based learning environments offer students a variety of options for demonstrating mastery and numerous opportunities for active engagement in the learning process.*

AIMS

o Provide flexibility in the ways in which information is presented, in the ways in which students react to or demonstrate their knowledge and skills, in the ways in which students are motivated and engaged with their own learning.

o Reducing physical, cognitive and organisational barriers to learning.

o Provide appropriate adaptations, supports and challenges, and maintain high performance expectations for all students.
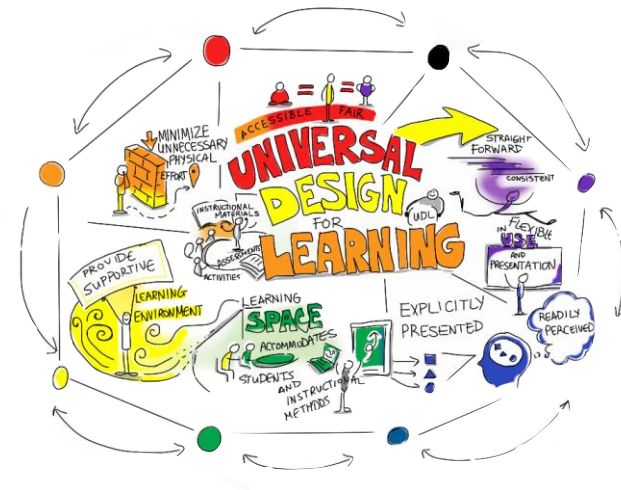
(CAST, 2018)

o Based on research in neuroscience, learning sciences and cognitive psychology.

o The empirical basis of neuroscience provides a solid foundation for understanding how the brain interacts with effective teaching. The mind is composed of three different networks that are used in the learning process: recognition, strategic and affective.

o The support structure and its gradual removal is important for learning in almost every field, from learning to walk, run or cycle to long periods of learning.

o Bloom adopted similar principles of understanding individual differences and the pedagogy needed to deal with them.

o Vygotskij emphasised one of the key points of the UDL curricula, the importance of gradual support structures.

(CAST, 2018)

Why UDL?...

Social Justice

❖ Social justice refers to advocating for an equal distribution of opportunity and fairness regardless of individual differences.

❖ Social justice can reduce overall poverty and give everyone access to high-quality education.

❖ Social justice promotes anti-bias education and teaching by being proactive towards discriminatory issues and creating an inclusive system.

Universal Design for Learning

❖ Research supporting Universal Design for Learning (UDL) has grown exponentially.

❖ UDL is a framework that works to remove barriers in the education system for individuals with or without a disability.

❖ Universal Design is an approach that was initially developed to adapt the structure environment (building, curbs, etc.) to improve access for individuals with physical disabilities.

❖ The concept of Universal Design has now been applied to learning, and has been found to be beneficial for all individuals.

Universal Design for Learning

❖ UDL is a system for education that focuses on learner variability and the unique needs of each student.

❖ Similar to how one teaching style does not work for everyone, neither does one learning style.

❖ It is essential to have a system that accounts for individual variance.

❖ UDL has been shown to improve the quality of education as a whole.

Universal Design for Learning

❖ UDL can account for a variety of differences or barriers between learners in the classroom, such as:

- Psychiatric disorders
- Learning disabilities
- Visual disabilities
- Auditory disabilities
- Cognitive disabilities
- Mobility impairment

Three key principles of UDL

THREE KEY PRINCIPLES OF UNIVERSAL DESIGN OF LEARNING - UDL

GRAPHIC ORGANIZER

CAST | Until learning has no limits

	Provide multiple means of **Engagement** Affective Networks The "WHY" of Learning	Provide multiple means of **Representation** Recognition Networks The "WHAT" of Learning	Provide multiple means of **Action & Expression** Strategic Networks The "HOW" of Learning
Access	Provide options for **Recruiting Interest** • Optimize individual choice and autonomy • Optimize relevance, value, and authenticity • Minimize threats and distractions	Provide options for **Perception** • Offer ways of customizing the display of information • Offer alternatives for auditory information • Offer alternatives for visual information	Provide options for **Physical Action** • Vary the methods for response and navigation • Optimize access to tools and assistive technologies
Build	Provide options for **Sustaining Effort & Persistence** • Heighten salience of goals and objectives • Vary demands and resources to optimize challenge • Foster collaboration and community • Increase mastery-oriented feedback	Provide options for **Language & Symbols** • Clarify vocabulary and symbols • Clarify syntax and structure • Support decoding of text, mathematical notation, and symbols • Promote understanding across languages • Illustrate through multiple media	Provide options for **Expression & Communication** • Use multiple media for communication • Use multiple tools for construction and composition • Build fluencies with graduated levels of support for practice and performance
Internalize	Provide options for **Self Regulation** • Promote expectations and beliefs that optimize motivation • Facilitate personal coping skills and strategies • Develop self-assessment and reflection	Provide options for **Comprehension** • Activate or supply background knowledge • Highlight patterns, critical features, big ideas, and relationships • Guide information processing and visualization • Maximize transfer and generalization	Provide options for **Executive Functions** • Guide appropriate goal-setting • Support planning and strategy development • Facilitate managing information and resources • Enhance capacity for monitoring progress
Goal	**Expert learners** who are... **Purposeful & Motivated**	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

udlguidelines.cast.org | © CAST, Inc. 2018 | Suggested Citation: CAST (2018). Universal design for learning guidelines version 2.2 [graphic organizer]. Wakefield, MA: Author.

Design of UDL

Multiple Means of Engagement

- ❖ Connects to the learners affective brain network, which is the "why" of learning.

- ❖ Engagement refers to how the students interact with the material, instructors and peers in the classroom environment.

- ❖ Increase collaboration, interest, effort and self-regulation.

- ❖ Allows the learner to be purposeful and motivated.

PRINCIPLE I - UDL

Provide multiple means of Engagement

❏ The "WHY" of learning.

❏ Close integration that exists between **cognitive processes** and **motivational** and **emotional** systems and how these interact on learning.

❏ **Affect** represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn.

❏ There are a variety of sources that can influence individual variation in affect (e.g. neurology, culture, personal relevance, subjectivity, and background knowledge...).

➜ **There is not one means of engagement that will be optimal for all learners in all contexts**

➜ *Providing multiple options for engagement is essential*

PRINCIPLE I – UDL

Provide multiple means of Engagement

GUIDELINE 7. PROVIDE OPTIONS FOR RECRUTING INTEREST

- Information that is not paid attention to, that does not engage student's cognition, is effectively inaccessible.

- Teachers strive to capture student's attention and engagement but they differ significantly in what attracts their attention and engages their interest. Even the same student will differ over time and circumstances; their 'interests' change as they develop and acquire new knowledge and skills.

- It is important to have alternative ways of recruiting students' interest that reflect the important inter- and intra-individual differences between students.

PRINCIPLE I - UDL

Provide multiple means of Engagement

CHECKPOINT 7.1 - Optimize individual choice and autonomy

- In an instructional educational setting, it is often appropriate to offer choices about how that goal can be achieved, the context for achieving the goal, the tools or supports available, and so on.

- Offering learners choices can develop self-determination, pride in achievement, and increase the degree to which they feel connected to their learning.

- Individuals differ in the amount and type of choices they prefer to have. It is therefore not enough to simply provide a choice. The right type of choice and level of independence must be optimised to ensure engagement.

Provide multiple means of Engagement

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 7.1 - Optimize individual choice and autonomy

- Provide learners with as much discretion and autonomy as possible by providing choices in such things as:
  - The level of perceived challenge
  - The type of rewards or recognition available
  - The context or content used for practicing and assessing skills
  - The tools used for information gathering or production
  - The color, design, or graphics of layouts, etc.
  - The sequence or timing for completion of subcomponents of tasks
- Allow learners to participate in the design of classroom activities and academic tasks
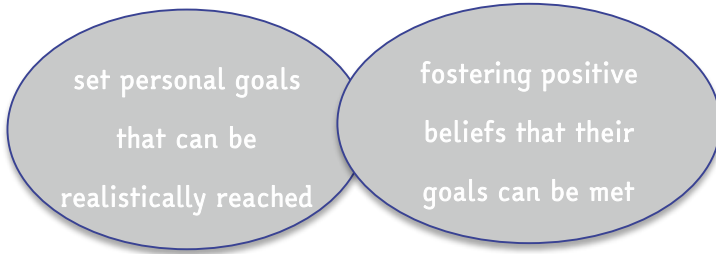- Involve learners, where and whenever possible, in setting their own personal academic and behavioral goals

VRAILEXIA

Co-funded by the Erasmus+ Programme of the European Union

PRINCIPLE I - UDL

Provide multiple means of Engagement

- One important aspect of self-regulation is the personal knowledge each learner has about what he or she finds motivating, be it *intrinsic* or *extrinsic*.

- Learners need to be able to:

  set personal goals that can be realistically reached

  fostering positive beliefs that their goals can be met

- To accomplish this, learners need to be able to:

  to deal with frustration

  avoid anxiety

  when they are in the process of meeting their goals.
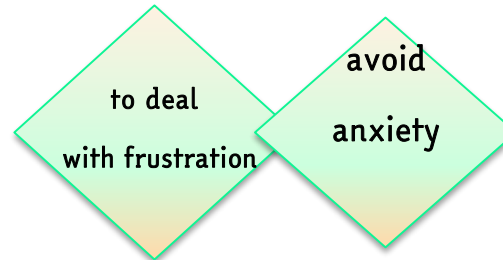
- Multiple options need to be given to learners to help them stay motivated.

VRAILEXIA

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 9.1 - Promote expectations and beliefs that optimize motivation

• Provide prompts, reminders, guides, rubrics, checklists that focus on:

- Self-regulatory goals like reducing the frequency of aggressive outbursts in response to frustration

- Increasing the length of on-task orientation in the face of distractions

- Elevating the frequency of self-reflection and self-reinforcements

• Provide coaches, mentors, or agents that model the process of setting personally appropriate goals that take into account both strengths and weaknesses

• Support activities that encourage self-reflection and identification of personal goals

Design of UDL

Multiple Means of Representation

❖ Connects to the learners recognition brain network, which is the "how" of learning.

❖ Representation refers to how the material is given in the classroom, such as lectures, visuals, audio, videos, hands-on activities.

❖ Increase the likelihood that students can learn and memorize more effectively.

❖ Allows the learner to be resourceful and knowledgeable.

PRINCIPLE II – UDL

Provide multiple means of Representation

❏ The "**WHAT**" of learning

❏ Learners differ in the ways that they perceive and comprehend information that is presented to them.

❏ For example, those with learning disabilities (e.g., dyslexia) may all require different ways of approaching content. Others may simply grasp information quicker or more efficiently through visual or auditory means rather than printed text.

❏ Also learning, and transfer of learning, occurs when multiple representations are used, because they allow students to make connections within, as well as between, concepts.

➔ There is not one means of representation that will be optimal for all learners

➔ *Providing options for representation is essential*

Provide multiple means of
Representation

Recognition Networks
The "WHAT" of Learning

Provide options for
Perception
- Offer ways of customizing the display of information
- Offer alternatives for auditory information
- Offer alternatives for visual information

Provide options for
Language & Symbols
- Clarify vocabulary and symbols
- Clarify syntax and structure
- Support decoding of text, mathematical notation, and symbols
- Promote understanding across languages
- Illustrate through multiple media

Provide options for
Comprehension
- Activate or supply background knowledge
- Highlight patterns, critical features, big ideas, and relationships
- Guide information processing and visualization
- Maximize transfer and generalization

PRINCIPLE II - UDL

Provide multiple means of Representation

GUIDELINE 1. PROVIDE OPTIONS OF PERCEPTION

- Learners differ in the ways that they perceive and comprehend information that is presented to them.

- Learning is impossible if information is imperceptible to the learner, and difficult when information is presented in formats that require extraordinary effort or assistance.

- To reduce barriers to learning, it is important that key information is equally perceptible to all student by:

Providing the same information through different modalities (e.g., through vision, hearing, or touch)

Providing information in a format that will allow for adjustability by the user (e.g., text that can be enlarged, sounds that can be amplified)

➔ Such multiple representations not only ensure that information is accessible to learners with particular sensory and perceptual disabilities, but also easier to access and comprehend for many others.

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 1.1 - Offer ways of customizing the display of information

- The size of text, images, graphs, tables, or other visual content

- The contrast between background and text or image

- The color used for information or emphasis

- The volume or rate of speech or sound

- The speed or timing of video, animation, sound, simulations, etc.

- The layout of visual or other elements

- The font used for print materials

VRAILEXIA

Co-funded by the
Erasmus+ Programme
of the European Union

PRINCIPLE II – UDL

Provide multiple means of Representation

- Sound is a particularly effective way to convey the impact of information.

- The human voice is particularly effective for conveying emotion and significance.information.

- Conveyed solely through sound is not equally accessible to all learners and is especially inaccessible for learners with hearing disabilities, for learners who need more time to process information, or for learners who have memory difficulties.

- Listening is a complex strategic skill that must be learned. To ensure that all learners have access to learning, options should be available for any information, including emphasis, presented aurally.

VRAILEXIA

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 1.2 - Offer alternatives for auditory information

- Use text equivalents in the form of captions or automated speech-to-text (voice recognition) for spoken language

- Provide visual diagrams, charts, notations of music or sound

- Provide written transcripts for videos or auditory clips

- Provide American Sign Language (ASL) for spoken English

- Use visual analogues to represent emphasis and prosody (e.g., emoticons, symbols, or images)

- Provide visual or tactile (e.g., vibrations) equivalents for sound effects or alerts

- Provide visual and/or emotional description for musical interpretation

Design of UDL

Multiple Means of Action & Expression

❖ Connects to the learners strategic brain network, which is the "what" of learning.

❖ Action and Expression refers to how students demonstrate what they have learned and be assessed on their work.

❖ Students can complete a task in different and meaningful ways.

❖ Allows the learner to be strategic and goal-directed.

PRINCIPLE III - UDL

Provide multiple means of Action & Expression

❑ The "**HOW**" of learning.

❑ Learners differ in the ways that they can navigate a learning environment and express what they know.

❑ For example, individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organizational abilities (executive function disorders) or language barriers and so forth approach learning tasks very differently.

❑ Action and expression require a great deal of **strategy**, **practice**, and **organization**.

→ There is not one means of action and expression that will be optimal for all learners

→ *Providing options for action and expression is essential*

Provide options for
Physical Action
• Vary the methods for response and navigation
• Optimize access to tools and assistive technologies

Provide options for
Expression & Communication
• Use multiple media for communication
• Use multiple tools for construction and composition
• Build fluencies with graduated levels of support for practice and performance

Provide options for
Executive Functions
• Guide appropriate goal-setting
• Support planning and strategy development
• Facilitate managing information and resources
• Enhance capacity for monitoring progress

GUIDELINE 4. PROVIDE OPTIONS FOR PHYSICAL ACTION

- Limited navigations and interactions (e.g., turning pages, writing in designated spaces, using a joystick or keyboard) will raise barriers for some learners - those with physical disabilities, blindness, specific learning disabilities such as dysgraphia, or who require support for executive functions.

- It is important to provide materials with which all learners can interact.

- Appropriate curricular materials provide an interface with common assistive technologies through which individuals with mobility impairments can navigate and express what they know (e.g. navigate or interact with a single button, through voice-activated buttons, expanded keyboards and other products).

PRINCIPLE III - UDL

Provide multiple means of Action & Expression

- Students differ in their ability to navigate their physical environment.

- Provide alternative means for response, selection and composition to reduce the emergence of possible barriers to learning when faced with the motor demands of a task.

- Learners differ in their optimal means of navigating through information and activities. To provide equal opportunities for interaction with learning experiences, an educator must ensure that there are multiple means for navigation and that control is accessible.

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 4.1 - Vary the methods for response and navigation

- Provide alternatives in the requirements for rate, timing, speed, and range of motor action required to interact with instructional materials, physical manipulatives and technologies

- Provide alternatives for physically responding or indicating selections (e.g., alternatives to marking with pen and pencil, alternatives to mouse control)

- Provide alternatives for physically interacting with materials by hand, voice, single switch, joystick, keyboard, or adapted keyboard

PRINCIPLE III - UDL

Provide multiple means of Action & Expression

- Providing a learner with a tool is often not enough.

- Provide support to use the tool effectively.

- Many students need help to navigate their environment (both in terms of physical space and curriculum).

- Provide opportunities for all to use tools to achieve the goal of full participation in the classroom.

- A significant number of students with disabilities and specific difficulties need to use assistive technologies regularly for navigation, interaction and composition.

- It is essential that educational technologies and curricula do not impose unintentional barriers to the use of these assistive technologies (e.g. ensuring that keyboard commands are present for each mouse action).

Provide multiple means of Action & Expression

EXAMPLE

of

IMPLEMENTATION

CHECKPOINT 4.2 - Optimize access
to tools and assistive technologies

- Provide alternate keyboard commands for mouse action

- Build switch and scanning options for increased independent access and keyboard alternatives

- Provide access to alternative keyboards

- Customize overlays for touch screens and keyboards

- Select software that works seamlessly with keyboard alternatives and alt keys

VRALEXIA

Co-funded by the
Erasmus+ Programme
of the European Union

UDL for Post-Secondary Education

❖ **Why use UDL in post-secondary education?**

   ■ Use to deal with significant times of change in the world and be adaptable.

   ■ Create an inclusive curriculum that allows everyone an equal opportunity to succeed.

   ■ Transform novice learners into expert learners.

   ■ Create competent learners who will succeed in the workforce when they graduate.
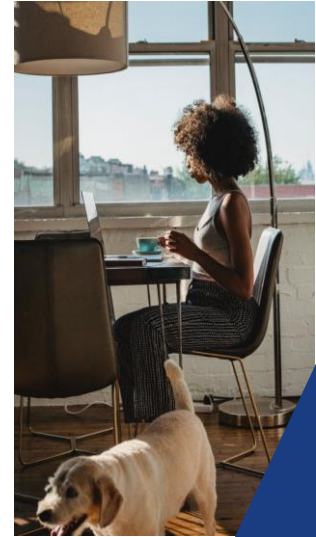
Into practice...

- **Workshop session**

Closing Notes

- ❖ The world is constantly evolving and changing, and being adaptable is an essential survival skill.

- ❖ Education is based on being knowledgeable and being a leader of change; therefore, it is our responsibility to embrace change and make improvements for the benefit of students and faculty.

- ❖ Change can promote organizational survival, innovation and diversity.

- ❖ UDL is a heavily researched and reliable approach which promotes social justice in the education system.

Thank you for listening!