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International scientific conference on economic development
and legacy of Simon Kuznets, October 16, 2025
Simon Kuznets Kharkiv National University of Economics, Kharkiv, Ukraine
Area of discussion: Academic Freedom and Inclusion in the Digital Age

FUNCTIONAL APPROACH TO THE SELECTION OF DIGITAL TOOLS FOR THE DESIGN OF INCLUSIVE UNIVERSITY ENVIRONMENT

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Outline of the presentation

1. The concept of Universal Design for Learning (UDL) and their guidelines for the realization of the education accessibility in the university inclusive learning environment.

2. Variability as a way to ensure the universality of learning in inclusive university courses: the ways and digital tools to achieve variability of
- Students' Engagement;
- Learning Content Presentation;
- Students' Action & Knowledge Expression.

3. Piloting the course "Tools for inclusive course design" as a component of inclusive virtual campus (AFID project)

The concept of UDL and its urgency for the realization of the education accessibility

UDL is recognized as a scientifically valid framework for guiding educational practice that:

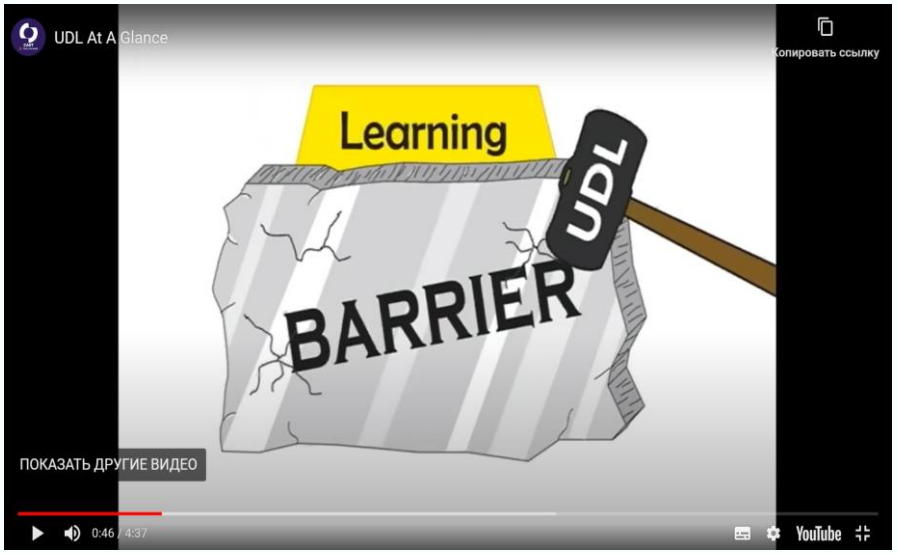
- Provides flexibility and adjustability in the ways of:

(1) Learning content **representation**,

(2) Students' **engagement**,

(3) Knowledge expression and skills demonstration by the students.

- Reduces barriers in instruction, providing appropriate accommodations, supports, and challenges, and maintains high achievement expectations for ALL the students.



Provided by the Higher Education Opportunity Act of 2008 (HEOA). https://mtsac.libguides.com/udl/overview

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Why is it important to ensure such flexibility and adaptability?

(1) It is necessary to take into account the diversity of students

(2) The way each of us learns is as unique as our fingerprints

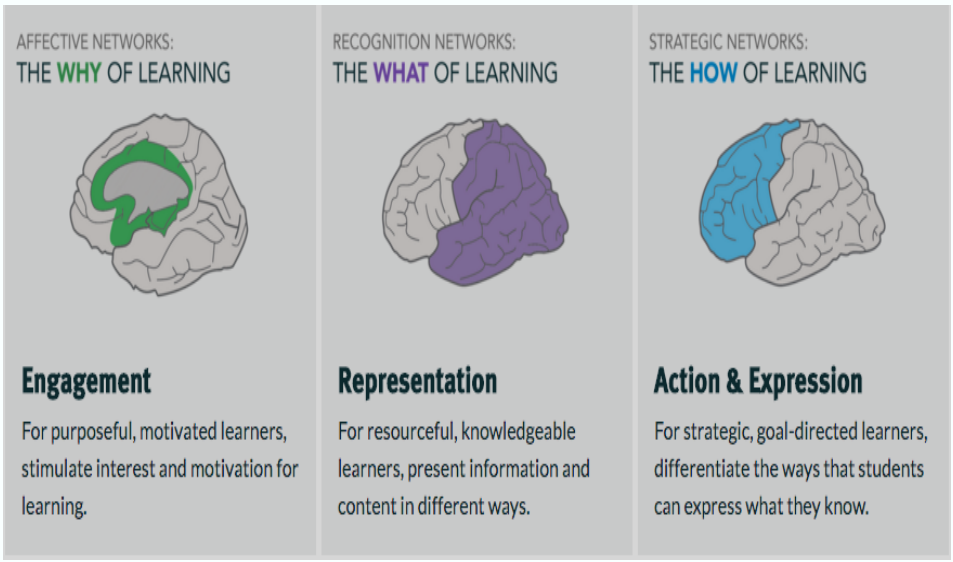
Therefore, the learning environment must accommodate this diversity.

The UDL concept is based on neuropsychology, identifying three large-scale brain networks.

According to neuropsychology, **the learning process is based on the interaction of several large-scale brain networks**, each of which is responsible for certain aspects of information perception, information processing, and decision-making:

1. **Affective networks (why we learn)**:
• Responsible for motivation, interest, and emotional aspects of learning.
2. **Receptive networks (what we learn)**:
• Responsible for the perception and processing of information (vision, hearing, touch).
3. Strategic networks (how we learn):
• Responsible for planning, organizing and completing tasks.

Regarding these networks helps to develop teaching strategies that take into account the neuropsychological diversity of learners.



The main principles of UDL, which:

- are based on neuropsychological research,
- determine UDL,
- provide a basic framework for implementing UDL

The Universal Design for Learning Guidelines

The goal of UDL is **learner agency** that is purposeful & reflective, resourceful & authentic, strategic & action-oriented.

	Design Multiple Means of Engagement	Design Multiple Means of Representation	Design Multiple Means of Action & Expression
Access	Design Options for **Welcoming Interests & Identities** • Optimize choice and autonomy • Optimize relevance, value, and authenticity • Nurture joy and play • Address biases, threats, and distractions	Design Options for **Perception** • Support opportunities to customize the display of information • Support multiple ways to perceive information • Represent a diversity of perspectives and identities in authentic ways	Design Options for **Interaction** • Vary and honor the methods for response, navigation, and movement • Optimize access to accessible materials and assistive and accessible technologies and tools
Support	Design Options for **Sustaining Effort & Persistence** • Clarify the meaning and purpose of goals • Optimize challenge and support • Foster collaboration, interdependence, and collective learning • Foster belonging and community • Offer action-oriented feedback	Design Options for **Language & Symbols** • Clarify vocabulary, symbols, and language structures • Support decoding of text, mathematical notation, and symbols • Cultivate understanding and respect across languages and dialects • Address biases in the use of language and symbols • Illustrate through multiple media	Design Options for **Expression & Communication** • Use multiple media for communication • Use multiple tools for construction, composition, and creativity • Build fluencies with graduated support for practice and performance • Address biases related to modes of expression and communication
Executive Function	Design Options for **Emotional Capacity** • Recognize expectations, beliefs, and motivations • Develop awareness of self and others • Promote individual and collective reflection • Cultivate empathy and restorative practices	Design Options for **Building Knowledge** • Connect prior knowledge to new learning • Highlight and explore patterns, critical features, big ideas, and relationships • Cultivate multiple ways of knowing and making meaning • Maximize transfer and generalization	Design Options for **Strategy Development** • Set meaningful goals • Anticipate and plan for challenges • Organize information and resources • Enhance capacity for monitoring progress • Challenge exclusionary practices

CAST | Until learning has no limits

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It is important to provide multiple means for:

Students' Engagement;

Learning Content Presentation;

Students' Action & Knowledge Expression

on the each level of the each component of learning

https://mtsac.libguides.com/udl/principles

CAST (2018). *Universal design for learning guidelines version 2.2 [graphic organizer]*. Wakefield, MA: Author.

Identifying ways to achieve variability when developing an inclusive course

Therefore, when developing an inclusive course based on UDL, it is necessary to ensure **variability** in each of the specified components of learning, and preferably at all three levels, which makes it necessary to determine **the ways and tools to achieve such variability**.

Variability as a way to ensure the universality of learning in inclusive university courses

Universal Design for Learning (UDL) requires that the diversity of students' needs be considered to ensure equal access to educational resources.

Variability is a key principle that enables this goal to be achieved. In the context of an online course, variability can manifest itself in the formats of content delivery, assignments, communication methods, and assessment.

Examples:

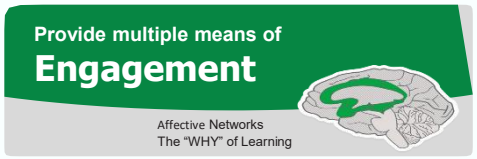
- Providing students with the opportunity to choose between text, audio, or video formats for learning.
- Introducing alternative assignment formats, such as written assignments, projects, or tests.
- Creating interactive modules that allow students to self-paced learning.
- Introducing case studies or simulations that allow students to work through real-world situations in a safe online environment.

The ways to achieve variability in students' engagement and motivation in inclusive courses

Student motivation is a key factor in successful learning.

To achieve variability in student engagement in order to motivate them, it is important to consider **different ways to activate** the attention and interest of course participants at different levels.

Ways to achieve variability in students' engagement and motivation in inclusive courses on different levels



	How <u>variability</u> can be achieved	What variability provides for inclusion and ensuring universality of learning
Welcoming and maintaining interest in learning	• Varied ways to draw attention to relevant information; • Supporting individual choice and autonomy; • Custom settings to minimize distractions and "false security"	**Accessibility of educational content:** information that is not paid attention to, that does not engage students in learning, effectively remains inaccessible to them**. Alternative ways of drawing attention to relevant information contribute to its "accessibility" for students with different levels of interest and preferences.**
Sustaining effort and persistence	• Increasing the relevance of goals and objectives • Variation (ranking) of course and microtask requirements • Stimulating collaboration through various means of interactivity • Increasing feedback aimed at improving learning outcomes	**A key goal of learning is to develop individual self-regulation and self-determination skills that will level the opportunities for learning. The learning environment should provide options that can level the playing field by supporting students who differ in their initial motivation, self-regulation skills, etc.** Many types of learning, especially the learning of skills and strategies, require sustained attention and effort. Students vary considerably in their ability to self-regulate in this way. Their differences reflect differences in their initial motivation, abilities and skills, receptivity to context, and so on.
Self-regulation as the ability to manage one's own emotional states for effective interaction with the learning environment	• Promoting expectations and beliefs that enhance motivation; • Developing personal skills and coping strategies; • Developing self-esteem and reflection.	Many people develop self-regulation skills on their own, through trial and error or by observing successful examples. Students in general have significant difficulty developing these skills. Individual differences are more likely than uniformity. A successful approach requires providing sufficient alternatives to support students with widely varying abilities and prior experiences to effectively manage their own engagement in learning.

Ways to achieve variability in students' engagement and motivation in inclusive courses

In general, the following methods and ways to achieve variability can be formulated:

- Using interactive elements, such as quizzes, surveys or quests.
- Providing emotional connection through personalized greetings, discussions in forums or support from the teacher.
- Engaging students in group or pair work through interactive platforms.

Successful examples of platforms and tools: There will be more detailed examples with pictures

Kahoot!: used to create quizzes and games that increase interest in learning.

Mentimeter: allows you to create interactive surveys and collect student opinions in real time.

Trello: helps organize group projects and provides transparency in the distribution of tasks.

ClassCraft: implements gamification and its elements

Padlet: an interactive whiteboard for collaboration and exchange of ideas between students.

Ways to achieve variability in Learning Content Presentation of inclusive courses

The presentation of learning content in an inclusive course should be adapted to the diverse cognitive and sensory needs of students.

This includes ensuring that information is accessible through different channels and formats at different levels of presentation of learning content.

Ways to achieve variability of Learning Content Representation on different levels

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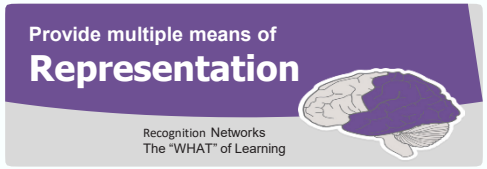

	How variability can be achieved	What variability provides for inclusion and ensuring universality of learning
Perception of learning content	• providing learning content in various ways (through sight, hearing, touch, etc.); • providing information in a format that allows the user to customize it.	**Accessibility of learning content in a direct physical sense.**
Linguistic-symbolic form of learning content representation	• Representation of the learning content in **various forms from the standpoint of its cognitive perception and awareness** (through explanation of textual and symbolic information, different structuring, multiple visualization using various multimedia tools); • Representation of the learning content in different languages	Alternative presentations in different formats provide **not only accessibility, but also clarity, transparency, and comprehensibility for all students**. When information is presented to all students through a single form of presentation, the result is inequality in the ability of all students to understand it.
Understanding and awareness of educational content (building system of knowledge)	• Appealing to previously acquired knowledge; • Generalization of educational information in various ways (through a semantic portrait of educational content, infographics, supporting (video) summaries) • Managing the process of assimilation (processing) of educational content using interactive visualization	Promotes active **awareness**, understanding, and assimilation of content by students with different types of intelligence and with different abilities. In fact, this way **the main goal of UDL is achieved - not only to make information accessible for perception, but rather - to teach students to transform the information available to them into knowledge ready for their application**.

The ways to achieve variability of Learning Content Presentation in an inclusive course

Methods and ways to achieve variability:
Content presentation should be adapted to the diverse cognitive and sensory needs of students. This includes ensuring that information is accessible through a variety of channels and formats.

Strategies:

- Using text materials, infographics, video lectures, and podcasts to present the same material.
- Using responsive design tools that allow you to change the font, color, or size of text (such as accessibility features in Microsoft Word or Adobe Reader).
- Providing supporting materials such as notes, summaries, or sign language translation.
- Using interactive platforms such as H5P to create adaptive learning modules with embedded videos, texts, and quizzes.
- Integrating subtitles in video and audio materials to ensure accessibility for students with hearing impairments.

There will be more detailed examples of exact digital tools with pictures

The digital tools to achieve variability of Learning Content Presentation in an inclusive course

Сервіси для перетворення навчального контенту у відеоформат (**AIInvideo, Elai**);
Застосування вбудованих засобів доступності в середовищах створення навчального контенту.
Графічні організатори (**Lucidchart, Napkin, Canva**);

Сервіси для побудови семантичного портрету тексту (**Voyant Tools, TextAnalyzer**)

Сервіси для створення інтерактивного відео, презентацій тощо **(H5P, ISLCollective, EddPuzzle, Mentimeter)**

Ways to achieve variability in the means of Students' Action & Knowledge Expression.

It is important to provide students with the opportunity to choose how to complete tasks and demonstrate their knowledge.

This promotes creativity and reduces barriers to learning.

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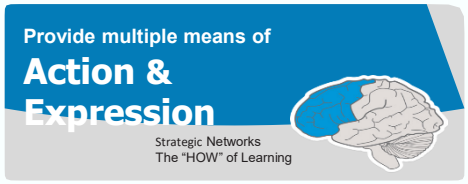
Ways to achieve variability in the means of Students' Action & Knowledge Expression on different levels



	How variability can be achieved	What variability provides for inclusion and ensuring universality of learning
Physical actions to access and navigate learning content	•Varied navigation and feedback methods; •Supporting individual access to learning tools and assistive technologies;	Accessibility of learning content: Information that is difficult to access or illogically arranged creates a barrier to its accessibility, effectively remaining inaccessible to them. Alternative methods of navigation contribute to its "accessibility" for students with different needs.
Expression (demonstration) of knowledge and communication	• Variety of communication tools • Provide opportunities for students to demonstrate knowledge through a variety of tools and formats. • Provide assessment flexibility through graded levels of support for practical tasks and performance	There is no single way to express knowledge that is optimal for all students; therefore, providing options for learning activities and ways of expression is important to provide equal opportunities for academic achievement.
Implementation of executive functions (*)	• Managing the right goal setting • Supporting planning and developing learning strategies • Enhancing the ability to monitor learning progress	**Of particular importance to educators is the fact that executive functions are severely limited by working memory. This is true because executive functioning is severely impaired when:** 1. executive functioning must be dedicated to managing "lower-level" skills and responses that are not automatic or voluntary, so that "higher-level" functioning is utilized; 2. executive functioning itself is impaired by some higher-level disability or lack of fluency in executive strategies.

(*) **Executive functions** are the abilities that allow people to overcome impulsive, short-term responses to the environment and instead set long-term goals, plan effective strategies to achieve those goals, monitor their progress, and change strategies as needed..

Ways to achieve variability in the means of Students' Action & Knowledge Expression.

Methods:

- Providing a choice between writing an essay, creating a presentation, a video, or a poster.
- Using digital tools that allow students to work interactively on assignments (e.g., Padlet or Google Jamboard).

- Integrating multimedia content creation platforms such as Canva (for designing presentations and posters) or Powtoon (for creating animated videos).
- Using teamwork tools such as Miro or Trello to collaborate on projects.
- Using formative assessment, such as self-reflection or peer assessment, so students can reflect on their achievements.

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Digital tools to achieve variability in the means of Students' Action & Knowledge Expression.

Застосування вбудованих засобів доступності в середовищах створення навчального контенту.

Інструменти для створення інфографіки як альтернативного способу вираження студентами їх знань та думок (**Lucidchart, Napkin, Canva**);

Інструменти для створення цифрових історій (**MyStorybook Moovly, Adobe Spark)**

Інструменти для створення інтерактивного відео та презентацій (**H5P, ISLCollective, EddPuzzle, Mentimeter**);

3 Author’s course “Tools for inclusive course design” as a component of inclusive virtual campus (AFID project).

All of these didactic and psychological pillars as well as proper digital tools made a basis for the development and implementation of the author’s course “Tools for inclusive course design” as a component of inclusive virtual campus (AFID project).

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Теоретичне підгрунтя курсу
Theoretical framework of the course

Засади доступності (accessability) сучасної вищої освіти

Accessibility issues in modern higher education

Принципи універсального дизайну в навчанні (Universal Design for Learning (UDL)).

Principles of Universal Design for Learning

Нейро-психологічні засади реалізації принципів UDL для кожного з компонентів навчання

Neuro-psychological foundations of implementing UDL principles for each component of learning

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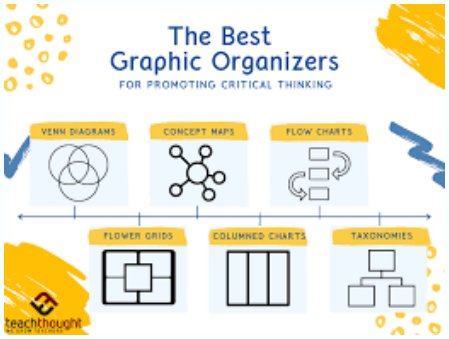
Практичний фокус курсу: опанування цифрових інструментів

Practical focus of the course: digital tools mastering



invideo AI

Key Findings after Piloting

- **Completion Rate**: 80% of enrolled students finished.
- **Satisfaction Levels**: average 4.55-4.9 rating for content, accessibility.
- **Inclusion Feedback**: 99% of students who felt supported.
- **Technological Challenges**: 20 % of students reporting connectivity/interface issues.
- **Instructor Evaluation**: 4.9-5 rating for training adequacy and support effectiveness.

Strengths & Successes

- Accessible inclusivity features (subtitles, multilingual materials, visual generalization of the content) (average rating 4.55)
- The structure of the course materials was clear and logical, the content was very detailed (average rating 4.9)
- High engagement: active participation, the tasks were engaging, interactive, and contributed to the development of the students' skills (average rating 4.9)
- Effective instructor–student interactions (average rating 4.9)
- Improved digital literacy among all stakeholders (rating 5).

Strengths & Successes

Some selected students' reviews:

S1: I am sincerely grateful to Ms. Lyudmila personally and to the organizers for the opportunity to take this course! In these difficult times, you support such a high level and quality of educational services and that's cool! After all, it is practical, interesting and as meaningful as possible. I am already using the knowledge I have gained in my practical activities (teaching, scientific, educational, practical-psychological/therapeutic, volunteer). Thank you very much!!!!

S2: The course was wonderful, exciting and absolutely innovative for me personally. Not only the course content, but also the presentation of the course by the author - Professor Lyudmila Gryzun - was very useful for me: 1) the presentation - short, bright, visual; 2) text; 3) video; 4) … the structuring of the course and tasks in Classwork, which is logically combined with Assignments. …. Professor Lyudmila Gryzun's messages in the general chat … were very useful.

S3: The course is excellent. The program is logically and qualitatively planned. The only question is the platform on which the course is hosted.

Challenges & Areas for Improvement

- Occasional technical difficulties: e.g., connectivity, platform navigation.
- Need for more personalized support.
- Content enhancement opportunities (e.g., more multimedia or practical tasks).

- 1 - It was not possible to calculate the final grade in the course using MS Teams.
- Solution: transfer points to Excel and calculate the final grade there.

- 2 - Inability to implement all types of questions using Microsoft Teams + MS Forms.
- Solution: change the questions according to the types that are available here.

- 3 - Inability to give a final test task with a time limit and the ability to download the result as a file.
- Solution: change the approach to the final test task.

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Thanks for attention!