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Training kit on implementing inclusivity in the online courses (AFID Project)

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Introduction

One of the main tasks of modern online education is to create a comfortable environment in which each student is able to realise their own potential for successful entry into the labour market. This goal can be achieved through the introduction of modern, intuitive, inclusive and adapted ways of engaging students in the educational process, regardless of their learning abilities, developmental features or socio-economic status.

Inclusive education is full of various challenges, and one of them is digitalisation, which makes education more accessible to all, but also requires overcoming certain barriers. Ensuring inclusive distance education focuses on several areas¹:

1. Focusing on technological solutions that provide remote learning, in which technology is a tool for access to education at a distance (territorial inclusion), but the learning process takes place traditionally – students are provided with information, clear instructions (physical, emotional, gender inclusion), on the basis of which they should learn.

2. Focusing on the technological skills that students need to have or acquire in the course of their education. For example, students need to learn how to use a computer or special software to complete a course, take a test/exam, obtain a certificate, etc.

3. Focusing on technologies that complement the learning process, making it more inclusive and interesting (pedagogical aspects of choosing the right tools, immersive technologies and augmented reality).

The proposed set of training materials is the result of the implementation of the 2023-2025 AFID – Academic Freedom and Inclusion through Digitalisation project (ERASMUS-EDU-2022-CBHE-LS-101081850), funded by the European Union. The objective of the AFID project is to create a universal design for learning and teaching (Multi-Institutional Inclusive Virtual Campus – MIIVC) based on modern technologies of inclusive education in the context of accessibility and convenience, focused on students with different types of learning difficulties.

¹ Rūdolfā, A., Daniela, L. (2021). Learning platforms in the context of the digitization of education: A strong methodological innovation. The experience of Latvia. Makers at school, educational robotics and innovative learning environments: Research and experiences from FabLearn Italy 2019, 213-221. Springer. https://doi.org/10.1007/978-3-030-77040-2_28; Daniela, L. (2020). The concept of smart pedagogy for learning in the digital world. Epistemological approaches to digital learning in educational contexts. Taylor & Francis, 1-16; Daniela, L. (2021). Smart pedagogy as a driving wheel for technology-enhanced learning. Technology, Knowledge and Learning, 26, 711-718. <https://doi.org/10.1007/s10758-021-09536-z>

1. Fundamentals of inclusive learning and teaching

1.1. Inclusion as a form of social interaction. Inclusion in education

Inclusion (*English* inclusion – incorporation; *French* inclusif – one that includes; *Latin* include – conclude / incorporate) according to the encyclopaedic definition, it is a process of active involvement in social relations (study, work, leisure) “all citizens, regardless of their physical, intellectual, cultural, linguistic, national or other characteristics”². Otherwise, certain groups of people (e.g., people with physical or mental disabilities, members of various minority groups, the elderly) may be excluded from social life or even marginalised (e.g., ghettos of illegal migrants from Africa and Asia in the suburbs of Paris, Rome and Athens).

According to UNESCO’s definition³, inclusive education should respond to diverse needs, focusing on overcoming barriers to quality education and increasing engagement in the learning process and reducing exclusion for all learners. Inclusive education makes it possible for absolutely everyone, including people in difficult circumstances (permanent or temporary) due to disability, gender, poverty, age, cultural, ethnic or linguistic characteristics, migration, homelessness, military or political conflict, religious, sexual or other affiliation, to acquire the knowledge and skills demanded by the modern labour market.

In general, inclusive – inclusive of all or everything. Inclusion is one of the forms of social interaction between individuals (Table 1.1), which gained particular importance in the mid-twentieth century in connection with the adoption of the UN Universal Declaration of Human Rights⁴.

Table 1.1. The place of inclusion among the forms of social interaction of individuals

Forms of interaction	Category content in general	Content of the category in education	Examples
1. Exception, exclusion	Exclusion of certain individuals or groups from social processes, denial of public goods guaranteed to others. It occurs due to poverty, racism, language barriers, lack of confidence, etc.	Depriving or denying access to education to students on the basis of a particular characteristic in any way (directly or indirectly)	Denial of services to homeless people, people with disabilities, limited access to school education for Roma children for various reasons
2. Segregation	Policies and practices that segregate, restrict or prohibit the cohabitation, education, or professional activities of social groups that differ on racial, gender, social, religious, or other grounds	Education of students with certain characteristics in separate institutions (establishments) adapted to different or certain types of characteristics, in isolation from others	Apartheid policy, segregation of migrants, existence of special schools and colleges for students with disabilities

² Дефектологічний словник: Навчальний посібник. Київ: МП Леся, 2011. 528 с.

³ United Nations Organisation for Education Science and Culture (UNESCO) 2005, Guidelines for Inclusion: Ensuring Access to Education for All; Disability Inclusive Education. Education Learning and Development Module. Foundation Level, 2019. 26 p.

⁴ Інклюзія в освіті. http://podolivka.edu.kh.ua/korekcijna_osvita/inkluzivna_forma_navchannya; Інклюзивне навчання. http://osvita-koz.at.ua/index/inkluzivne_navchannja/0-56; Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

Forms of interaction	Category content in general	Content of the category in education	Examples
3. Integration	The process of combining any elements or parts into a single whole; the process of mutual convergence and the formation of interconnections based on the adaptation of a person to the requirements of the system	The process of placing students with a particular characteristic in existing educational institutions with the understanding that they will be able to adapt to the standardised requirements of such institutions	Adaptation of immigrants to the new cultural and linguistic environment, adaptation of children with disabilities to the standards of a regular school
4. Involvement, inclusion	Strengthening the participation of all citizens in the socio-economic life of society, regardless of race, gender, social, religious or other characteristics through the adaptation of the system to the needs of the individual	Creating equal opportunities for all students, including those with special educational needs, ensuring their success in the educational process and in later life	Barrier-free use of physical and social spaces by everyone, inclusive hiring and education practices, a student with dyslexia can get acquainted with the content of a book by listening to an audiobook instead of reading it

Source: compiled based on ⁵

Inclusion in education is aimed at adapting educational institutions to the needs of all students (new values, policies, search for new approaches to learning) and includes several important aspects⁶:

- 1) considering it as an ongoing process of mainstreaming diversity;
- 2) identifying and removing barriers to learning, e.g. for young people, adults and the elderly, people with disabilities, etc.;
- 3) creating conditions for the presence, participation and achievement of all students;
- 4) increased attention to the so-called “risk groups” among students who are at risk of expulsion or poor academic performance.

The goal of inclusion in education is to overcome social exclusion (as opposed to diversity). “The starting point of this concept is the belief that education is a fundamental human right and the basis for a more just and inclusive society”⁷.

1.2. Basics of distance learning

Distance learning can take place in two formats – synchronous and asynchronous, which have their advantages and disadvantages (Table 1.2). For the AFID project, the asynchronous mode was chosen, as synchronous distance learning is challenging for students who are employed full-time, live in a war zone, rural areas with interruptions in Internet access, etc. The disadvantages of the asynchronous mode will be overcome by constant feedback from teachers, maintaining a sense of

⁵ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

⁶ Інклюзія в освіті. http://podolivka.edu.kh.ua/korekcijna_osvita/inklyuzivna_forma_navchannya

⁷ Інклюзивна освіта. http://hrist-school.ucoz.net/index/inkluzivna_osvita/0-76

inclusion of all students in the learning community, foreign language content, and additional functions for presenting material for students with different types of disabilities.

Table 1.2. Key differences between distance learning modes

Type	Characteristics	Advantages	Disadvantages
1. Synchronous	“It involves interaction between the subjects of distance learning, during which students and teachers are simultaneously in the electronic educational environment or communicate through audio, video conferencing”	- feedback is provided in real time, just like a regular class; - direct interaction in small groups for quick discussion of problematic issues and decision-making;	- requires an online presence at a clearly defined time; - some time is spent on taking into account technical barriers, clarifications due to frequent interruptions in communication;
2. Asynchronous	“It involves interaction between the subjects of distance learning, in which participants interact with each other with a time delay, using interactive educational platforms, e-mail, forums, social networks, etc.”	- active learning at your own schedule and pace; - constant access to course materials in a convenient format.	- feeling more isolated due to the lack of a sense of learning community; - a high level of self-discipline and good time management skills.

Source: compiled based on ^{8,9}

There are two understandings of inclusive education – narrow and broad (Table 1.3).

Table 1.3. Inclusive education

Narrow understanding	Broad understanding
Inclusion of students with special educational needs or disabilities in general education institutions	Positive attitudes towards student diversity, valuing and accommodating the differences of each student

Source: compiled based on ¹⁰

In the AFID project, inclusivity is viewed in a broad sense and is identified with the desire to involve and integrate absolutely all students in the educational process, especially those who have suffered from discrimination, are temporarily or permanently disadvantaged, have disabilities, special educational needs, etc. An inclusive learning and teaching policy allows all stakeholders (teachers, students, university administration, etc.) to benefit from its implementation through inclusive values, which include the recognition of¹¹: diversity, equality and justice, cooperation, participation and community.

⁸ Пасічник, О. (2021). Синхронне й асинхронне дистанційне навчання. <https://osvita.ua/school/method/78950>

⁹ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

¹⁰ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

¹¹ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

1.3. Learning difficulties and tools to overcome them

In general, learning disabilities (difficulties) are considered by psychologists as disorders that affect the student's ability to learn at a normal pace¹². And it is not a matter of insufficient IQ (most people with learning disabilities have average and above average intelligence), but rather difficulties in receiving, processing or transmitting information (information asymmetry). Psychologists emphasise that such problems can relate to teaching both basic skills (reading, writing, mathematics) and higher-level skills (organisation, time planning, abstract thinking, attention, memory).

Learning difficulties can be classified into several types (permanent or temporary)¹³:

1. Auditory, related to problems with processing auditory information (e.g., deafness, ear infection, other language, age).

2. Visual, related to visual impairments and problems with processing visual information (e.g., blindness, cataracts, colour blindness).

3. Written, related to problems with the written representation of information, including spelling, handwriting, composition, etc. (e.g., dysgraphia, which affects the ability to write and fine motor skills).

4. Numerical, related to problems in mathematical categories such as quantity, value, sequence, time, etc. (e.g., dyscalculia, which affects a person's ability to understand numbers and learn mathematical facts).

5. Intellectual, related to problems in intellectual development (students with an IQ below 70 are considered to have significant delays in adaptive and social functioning¹⁴).

6. Physical, related to problems in motor skills or spatial orientation (e.g., dyspraxia, missing limb, limb injury or brain injury).

7. Verbal (language) related to language impairment or lack of knowledge, reading problems in the areas of word recognition, decoding or comprehension (e.g., dyslexia, dumbness, laryngitis, different cultural and linguistic backgrounds).

8. Emotional (psychological) related to emotional disorders and difficulties with concentration, behavioural control, hyperactivity (e.g., loss of relatives, war, loneliness, burnout at work).

9. Economic, related to financial and economic problems that prevent people from different income levels from studying (for example, unfavourable socio-economic situation, which affects the lack of funds to pay for education or purchase the necessary literature, gadgets, etc.).

10. Territorial, related to problems of access to content due to the fact that listeners live in remote areas or near the war zone, other countries, which often provokes isolation in terms of access to communication.

¹² What Types of Learning Disabilities Will You Encounter in the Classroom? All Star Staff. <https://www.alleducationschools.com/blog/learning-disabilities-defined>

¹³ Inclusive Education for Special Needs Students, 2023. <https://resilienteducator.com/classroom-resources/inclusive-classrooms-special-needs>; What Types of Learning Disabilities Will You Encounter in the Classroom? All Star Staff. <https://www.alleducationschools.com/blog/learning-disabilities-defined>; Types of Learning Disabilities. <https://ldaamerica.org/types-of-learning-disabilities>; Gannon, K. (2022). Taliban break promise on higher education for Afghan girls. The Diplomat. <https://thediplomat.com/2022/03/taliban-break-promise-on-higher-educationfor-afghan-girls>; Hui, N., Vickery, E., Njelesani, J., Cameron, D. (2018). Gendered experiences of inclusive education for children with disabilities in West and East Africa. International Journal of Inclusive Education, 22(5), 457-474; Cedeño, L.F., Martínez-Arias, R., Bueno, J.A. (2016). Implications of socioeconomic status on academic competence: A perspective for teachers. International Education Studies, 9(4), 257-267; Civitillo, S., Juang, L.P., Schachner, M.K. (2021). Stressing similarities or ignoring differences? Shedding light into different forms of color-evasive ideology with pre- and in-service teachers. Zeitschrift für Erziehungswissenschaft, 24, 135-153.

¹⁴ Measures of Intelligence. <https://courses.lumenlearning.com/atd-herkimer-intropsych/chapter/measures-of-intelligence>

11. Time-related problems with access to content due to time differences or inability to attend classes at the scheduled time (for example, students in different time zones, in regions with power outages, in the war zone).

12. Gender-related problems with access to education for women and girls in certain countries due to religious or cultural beliefs (e.g., Niger, Afghanistan), or for men and boys after returning from a war zone and trying to adapt to civilian life (e.g., Ukraine).

Given all the difficulties that students face or may potentially face, when designing inclusive courses, teachers need to design them to be able to be mastered by different students with different needs. All these difficulties necessitate the use of different types of inclusion (physical, verbal, emotional, economic, territorial, temporal, gender) with a certain set of tools (Table 1.4).

Table 1.4. Linking types of inclusion to learning difficulties and tools to minimise them

№	Difficulties	Inclusion	Tools
1.	Auditory-related	Physical	Use of subtitles (captions), translation options for different languages, auxiliary accessories for listening to audio, external speakers, visual materials to facilitate understanding, various chats for feedback
2.	Visual-related		Use of larger fonts, contrasts, colour schemes, screen readers, avoidance of flashing animations, translation options into different languages, and audio commentary
3.	Written-related		Providing the ability to complete assignments in audio/video formats, take tests instead of writing an essay or solving a complex task
4.	Numerical-related		Avoiding numerical information whenever possible, using storytelling
5.	Intellectual-related		Use clear instructions, various chats for feedback, diagrams and pictures, intuitive course design, avoiding flashing animations, breaking down the process of completing tasks into several simple and understandable stages
6.	Physical-related		Use simple keyboard navigation to get information and send tasks
7.	Verbal (language)-related	Verbal	The use of video lectures and the possibility of completing assignments in writing (essays, tasks, cases, etc.), the possibility of translation into different languages
8.	Emotional (psychological)-related	Emotional-psychological	Use of mini-videos and engaging content in presentations to focus attention, digital tools and motivating feedback
9.	Economical-related	Economical	Free access or affordable payment for courses for those who are interested, constant access to information on the platform from different types of gadgets
10.	Territorial-related	Territorial	Asynchronous access to educational content from any location, electronic assignments
11.	Time-related	Time	Asynchronous access to educational content at any time, depending on the needs, provision of assignments in electronic form, video and audio recording of lectures
12.	Gender-related	Gender	Equal access for men and women to educational content, tolerance and respect for different opinions on current issues, clear presentation of material for different genders

Source: own research

Ukrainian legislation identifies many categories of people with special educational needs¹⁵: persons with psychophysical development disorders, persons with disabilities, gifted students, working students, representatives of national and religious minorities, homeless and orphans, students from war zones, etc., so there is a need to change and adapt the content of classes, their duration, teaching load, educational process and environment to their needs through various tools for delivering information and control measures.

The main functions of inclusive education are legal, educational, economic and social, while the principles on which it is based include uniqueness, learning together, diversity, quality, etc. (annex A).

1.4. Barriers to inclusive education and psychological diagnosis

When providing inclusive education services to different target groups (annex B), there are often various barriers to inclusive education:

1. Physical or infrastructural, including the inaccessibility of public spaces, buildings, and facilities, as well as infrastructure for all groups interested in learning, including people with disabilities, the elderly, people with health problems of various types, parents with baby carriages and other people with limited mobility. In the AFID project, this barrier will be removed by providing distance learning courses in asynchronous mode for all interested parties.

2. Unconscious biases, which include social stereotypes (beliefs) about certain groups and individuals that are formed outside of one's own consciousness. All these prejudices come from the human tendency to organize the social environment through categorization and stigmatization. In the AFID project, such a barrier will most often affect students who speak another language, have moved from the war zone, have a disability, are poor, etc. To overcome this barrier, it is often necessary to conduct mini training in a group of students on tolerance, equality and civil rights and freedoms.

3. Lack of motivation. In general, it is not the responsibility of the teacher to motivate students to learn, as students need to be self-motivated, especially those who study in an online environment (e.g. Coursera, Prometheus, Educational Era). However, there are things that a teacher can do to increase the level of motivation of all students, including those with special educational needs. For example, a lack of understanding of the content and purpose of the material due to a lack of clarity in the learning outcomes and how to achieve them is one of the motivational barriers. Another barrier is difficulties with understanding or interpreting materials, as well as the readiness to accept new knowledge under the influence of the social, economic, political and cultural environment.

In the AFID project, this barrier concerns students who combine work and study, giving priority to the former, suffering from psychological trauma, etc. In order to overcome this barrier, the teacher often needs to provide not only academic but also psychological support to the student during the course, explaining the need to master it for their future, etc.

To increase the level of learning motivation of students, for example, with special educational needs, you can use various methods of activating their attention¹⁶:

- creating a problematic situation related to the practical sphere of students' lives;

¹⁵ Про затвердження Переліку деяких категорій осіб з особливими освітніми потребами: Постанова КМУ від 14.11.2018 р. №952-2018-п.

¹⁶ Артюхов, А.С., Волк, Ю.Ю. (На)зустріч мотивації: від інфоциганства до менторства; Артюхов, А.С., Волк, Ю.Ю. Магічний кристал 651; Артюхов, А.С., Волк, Ю.Ю. Освітній крафтинг у віртуальному середовищі: кейс Minecraft.

- use of the effect of surprise during classes (including a sense of humour);
- adapting the material to a language understandable to students of a certain age (culture of communication);
- use of content that promotes the use of different types of analysers or senses;
- identifying potential group leaders, determining their preferences for further individual and group work in the classroom;
- conducting classes or their fragments in a non-standard format (competition classes, debate classes, round table classes, outdoor classes, etc.)
- use of elements of attributes of the familiar virtual world (gamification);
- involving students in assessment activities, etc.

In the context of distance asynchronous courses, of course, most of these techniques will not work, but you can activate students' attention with online tools, mixing theoretical information with real cases, video inserts, high-quality presentation material, etc.

4. Material comprehension, including a lack of clarity in teaching, lack of access to course materials in the optimal format for all students, lack of engagement, misunderstanding of the rules of grading during the learning process, etc. In the AFID project, this barrier for all inclusion groups should be overcome by clear and accessible instructions at the beginning of each course, constant access to materials in various formats, and effective communication with the teacher throughout the entire period of study.

5. Communication. Problems in understanding instructions, language, attitudes, social and cultural differences, and external pressures can interfere with the lecturer's ability to deliver clear messages or the students' ability to receive them effectively. Common emotions (anger, love, joy, frustration, sadness) can create emotional barriers that negatively affect lecturer-student communication. Cultural barriers can impede quality communication when different cultures are involved. Perceptual barriers (internal) create the feeling that the other person will not understand or is not interested in what you have to say (for example, the possibility of misinterpreting the content due to the person's gender). In the AFID project, this barrier applies to students of different ages or genders, different nationalities or regions of residence, working students who often do not have time for regular study, etc. This barrier is overcome by a competent communication policy of the teacher with students through various chats, e-mail, etc.

In general, the various barriers in the online learning environment for both students and teachers relate to several aspects:

- 1) the quality of the microphone, video camera, laptop, etc;
- 2) visual design problems, when speakers publish slides with fonts that are impossible to read due to their size, colour, style, etc;
- 3) lack of presentations with a focus on online content only;
- 4) problems with Internet traffic when the camera and sound are turned on at the same time;
- 5) lack of experience of the speaker in using body language, voice, simultaneous slide demonstration and following the chat with questions, and much more.

Quite often, when working with students with special educational needs, it is necessary to conduct a social and psychological diagnosis, which should be carried out by professional psychologists who are available at every university.

The algorithm of such diagnostics can be as follows¹⁷:

1. Checking the readiness of students with special educational needs to perceive the material together with everyone else, identifying learning difficulties, determining the causes of these difficulties.
2. Conducting individual observations of the behaviour of students with special educational needs during the educational process, peculiarities of behaviour and interaction with classmates, teachers in order to study their individual characteristics, inclinations, interests and needs.
3. Drawing up an individual programme of support for such students, developing an individual work plan taking into account the identified features, developing a schedule of individual consultations.
4. Developing recommendations on the organisation of education for students with special educational needs and providing them with additional services.
5. Participation in the development of materials necessary for adaptation with a list of appropriate forms and techniques.
6. Assistance in creating a positive microclimate in the student body and interaction with classmates, prevention of any discrimination and stigmatisation, tolerant attitude towards students with special educational needs.
7. Providing advisory assistance to teachers in working with such students.
8. Establishing cooperation with specialists who work directly with students with special educational needs.

1.5. Universal design in building educational courses

Educational services provided in both synchronous and asynchronous modes should comply with the basic principles of universal design, which means that any object, service or environment should be convenient for most users, regardless of their age, gender, body size, health or mobility¹⁸. The principles of universal design are:

- equal use;
- flexibility in use;
- simplicity and convenience;
- consideration of different sensory capabilities in the perception of information;
- tolerance to errors;
- low level of physical effort;
- availability of the required size and space for approach, access and other manipulations.

In the AFID project, the design of distance learning courses should comply with the principles of universal design to ensure physical, linguistic, gender, emotional, economic, temporal and territorial inclusion.

¹⁷ Психологічний супровід інклюзивної освіти: Метод. рек. / За заг. ред. Обухівської А.Г. Київ: УНМЦ практичної психології і соціальної роботи, 2017. 92 с.

¹⁸ Weber, H., Elsner, A., Wolf, D., Rohs, M., Turner-Cmucha, M. (2022). Inclusive Digital Education. Odense, Denmark. European Agency for Special Needs and Inclusive Education. 163 p.; Индекс инклюзии: загалноосвітній навчальний заклад: навчально-методичний посібник / Під заг. ред. В.І. Шинкаренко. К.: ТОВ «Видавничий дім «Плеяди»», 2013. 96 с.

2. Organisation and methods of inclusive education

2.1. Key teaching methods

The organisation of inclusive education is based on a set of methods of inclusive education – an orderly activity that ensures effective teacher guidance in the work of students with special educational needs to master relevant knowledge and skills. Inclusive education requires the use of the following teaching methods that are used in the study of all disciplines, regardless of their specifics.

Within the framework of the AFID project, it is proposed to use the following methods that have been tested in practice¹⁹:

1. **Mini video lectures**, in which the lecturer provides students with a significant amount of information in a sequential presentation subordinated to a single topic. For inclusive presentation of lecture material and maintaining interest, it is important to keep in mind the optimal pace of the lecture and the emotionality of the presentation (as a rule, videos should be up to 20 minutes). Such videos with high-quality content work well to ensure physical inclusion, linguistic, emotional and psychological, territorial and temporal inclusion.

Since for students with hearing impairments, for example, the most important information channel is visual perception with an emphasis on the lecturer's articulation, video lectures should include subtitles and translation into English. Subtitling is the process of converting the audio content of a television broadcast, webcast, video of various lengths or a real event into text and displaying it on a screen (monitor). Online programs for automatically adding subtitles: Kapwing, YouTube, Microsoft Translator, and many others. The absence of sound, unclear speech in the video, or hearing impairment – all these cases definitely add value to video presentations with subtitles. It should be borne in mind that automatically generated subtitles are not always a high-quality transcription of the audio track, and they need to be carefully checked and corrected before being uploaded to the learning platform. An alternative is to have the lecturer manually subtitle the video. Such subtitled video lectures eliminate auditory, visual, verbal, emotional, territorial, gender, and time difficulties in student learning.

2. **Exercises (individual or group)**, that teach through action. The use of exercises is aimed at developing skills and abilities through the repeated performance of learning activities. The teacher's control is extremely important in this case.

The presentation of exercises can be done through electronic textbooks (e-books) – a unique learning tool that can be installed via a link on a computer, contains a wide range of materials, and is constantly updated. The advantages of learning with e-textbooks are their built-in features: manipulating the size of fonts for students with visual impairments, overlaying voiceover on printed texts, adding subtitles for students with hearing impairments and better understanding of the content, and the ability to work remotely at a convenient time for students with different learning paces. Such exercises work well for physical inclusion, emotional and psychological inclusion, territorial

¹⁹ Artyukhov, A., Volk, I., Dluhopolskyi, O., Mieszajkina, E., Myśliwiecka, A. (2023). Immersive University Model: A Tool to Increase Higher Education Competitiveness. *Sustainability*, 15, 7771. <https://doi.org/10.3390/su15107771>; Artyukhov, A., Volk, I., Surowiec, A., Skrzypek-Ahmed, S., Bliumska-Danko, K., Dluhopolskyi, O., Shablysty, V. (2022). Quality of Education and Science in the Context of Sustainable Development Goals – From Millennium Goals to Agenda 2030: Factors of Innovation Activity and Socio-Economic Impact. *Sustainability*, 14, 11468. <https://doi.org/10.3390/su141811468>; Гнатюк, І. (2018). Методи інклюзивного навчання. <https://dpsz2018.blogspot.com/2018/11/blog-post94.html>

inclusion, gender inclusion, and time inclusion, eliminating auditory, visual, emotional, territorial, gender, and time barriers to learning for students.

3. **Case study (case method)** as learning through specific cases (situations, stories) related to a real-life problem. In a case study, the problem is often presented in an implicit (hidden) form, and it does not have an unambiguous solution, so each student can demonstrate their analytical, search, and communication skills to justify the answer. The case method works well for economic, emotional, territorial, gender and time inclusion, eliminating financial, economic, emotional, territorial, gender and time barriers to learning.

4. **Crosswords and interactive cryptograms** to get acquainted with the new terminology of the discipline. As a creative homework assignment, students can be asked to create a cryptogram using online tools. Such assignments work well for physical inclusion, gender, language, emotional, territorial and time, eliminating visual, written, physical, gender, emotional, territorial and time difficulties in student learning.

5. **Brainstorming method**, in which students exchange views on a specific issue through a class discussion. The advantage of this method is the stimulation of cognitive interest through the presentation of evidence, the ability to clearly express thoughts, and group work in various formats. This method works well to ensure emotional, territorial, gender and economic inclusion, eliminating emotional, territorial, gender and financial and economic barriers to learning.

6. **Work with textbooks, articles**, when in an asynchronous mode, the student gets acquainted with the material offered by the teacher and provides answers to the problematic questions. The inclusiveness of this method is ensured by both the availability of educational material via the Internet and the presentation of their own thoughts in writing. Another option for working with the text is the “wise owls” method, when students are asked to work through the content of the lecture text on their own, and then receive an online test with specific questions and tasks. When using this method, students with special educational needs can work with a tablet, which makes the work more interactive. This method works well to ensure physical, linguistic, emotional, territorial, time, gender and economic inclusion by eliminating physical, emotional, linguistic, economic, territorial, gender and time barriers to student learning.

7. **Method of training (business) games**, based on people’s affinity for various kinds of games. The essence of the game method is the modelling of real situations in which the actions of participants imitate real actions. This method is well suited for ensuring emotional, gender and territorial inclusion, eliminating emotional, gender and territorial difficulties in learning.

8. **Mentorship** as a tool for ensuring the professional development of students. The institute of mentoring is widespread in foreign universities and is important for inclusion through stimulating motivation to learn, mutual support, achievement of appropriate results by students, directing them in certain directions to achieve the goal, and conducting trainings (Fig. 2.1). This method is well suited for ensuring economic, gender and emotional inclusion by removing economic, emotional and gender barriers to student learning.

9. **Method «yes-no»** to assess the correctness of a particular statement. The aim of the method is to engage and involve all students, even the most passive ones. This method can be implemented using, for example, Kahoot or Mentimeter. This method is well suited for physical, gender and emotional inclusion, eliminating intellectual, written, numerical, physical, gender and emotional learning difficulties.

Mentorship	Motivation
	Advice
	Result
	Direction
	Support
	Goal
	Training

Fig. 2.1. Components of mentorship

Source: ²⁰

10. **Clusters, comparison charts, puzzles** to find keywords, find similarities and differences, etc. When using this method, the interactive platform LearningApps is useful. This method is well suited to ensuring physical, linguistic, emotional, territorial, and time inclusion, eliminating physical, emotional, linguistic, territorial, and time difficulties in student learning.

11. **Interactive learning** through online testing, work with electronic textbooks, curricula, and educational websites. This works well for physical, emotional, territorial and time inclusion, eliminating physical, emotional, territorial and time difficulties in learning.

12. **BarCamp (anti-conference)** – the essence of the method is to involve participants in the educational process in the organisation of the conference and present their own ideas, presentations, proposals on the issues outlined in advance. In an asynchronous mode, this can happen through the recording of such a BarCamp by a team leader, when students exchange opinions on a given topic (ridesharing), search for the most interesting ideas and discuss them with the formulation of conclusions. Such an anti-conference is possible among motivated students and ensures physical, emotional, economic, territorial, gender inclusion, eliminating physical, emotional, financial, economic, gender and territorial difficulties in students' education.

13. **Storytelling** is “the art of captivating storytelling and conveying the necessary information to influence the emotional, motivational, and cognitive spheres of the student. The educational material presented in the form of an interesting and exciting story contributes to the development of personal qualities, demonstrates the uniqueness of each student's imagination, and allows for activity and creativity”²¹.

Storytelling is facilitated by:

- 1) demonstration of video materials with the sound turned off;
- 2) independent selection of film fragments for storytelling in class;
- 3) demonstration of a familiar film, followed by the student's continuation and explanation;
- 4) comparative analysis of the textbook material with the content of the film with a demonstration of one's own position;
- 5) independent writing of a creative work based on the video material, etc.

This method is well suited for ensuring physical, emotional, territorial, economic, gender and time inclusion, eliminating physical, emotional, territorial, economic, gender and time difficulties in learning.

²⁰ Артюхов, А.С., Волк, Ю.Ю. (На)зустріч мотивації: від інфоциганства до менторства.

²¹ Сторітеллінг як метод навчання. <https://www.creativeschool.com.ua/blog/storitelling-yak-metod-navchannya>; Сторітеллінг: правила, техніки, корисні матеріали та поради. <https://eduhub.in.ua/news/storiteling-pravila-tehniki-korisni-materiali-ta-poradi>

14. **Gamification method**, which is now widely used at all levels of education. Gamification tools include Minecraft, Khan Academy, SoloLearn, Marriott, etc. Two types of gamification can be used:

1) gamification in a real environment using various approaches (role-playing games, brainstorming, etc.);

2) gamification in a virtual environment using various kinds of shells into which the educational process is embedded.

This type of gamification is becoming widespread due to the creation of various games with a predetermined scenario. At the same time, an interesting approach to gamification is to embed approaches from the real environment into the virtual environment and work with students not within a clearly defined scenario, but creatively. This method works well for ensuring emotional, linguistic, territorial and time inclusion, eliminating emotional, linguistic, territorial and time difficulties in learning.

2.2. Creating inclusive presentations

An important aspect of inclusive learning is the use of inclusive demonstration materials (presentations) for students. For a quality presentation of an online course, it is important to have high-quality sound, a normal pace of speech of the lecturer, minimisation of long monologues, clear instructions for completing tasks, visuals, subtitles, and consideration of different types of impairments.

Features of quality inclusive presentations:

1. Getting started.

In any speech, including online ones, the first two to three minutes are the most important, during which you establish contact with the audience (introduction, purpose and structure of the speech).

1.1. Greeting the audience.

1.2. Introduce yourself and your HEI. If you are going to use unfamiliar abbreviations, explain them fully.

1.3. Defining the purpose of the speech and the topic of the lecture.

1.4. Overview of the lecture: outline, approach used.

What you should pay attention to during presentations:

1. Your voice – the way you speak is as important as what you say: the amount of information, speed of delivery, intonation, clarity, pronunciation.

2. Body language is an independent subject. Body movements express what is really your attitude and thoughts.

3. Appearance – dress appropriately for the event.

All of these elements of a lecture are essential in inclusive courses and cannot compensate for each other as they might in mainstream courses, as the users of such courses may be students with disabilities (e.g., visual or hearing impairments). In addition to these elements, it is advisable to add subtitles to inclusive courses, as well as to use various programmes for the blind and visually impaired, as well as for the hearing impaired (annex C).

2. Presentation content.

2.1. Transitions. In an oral presentation, as in a written work, the lecturer should provide a transition to make the report more understandable for listeners with different pace of perception of the material. When moving from one section to another, use a transition to repeat or summarise what you have just discussed.

2.2. Road signs. In any presentation, some words act as signs on the road, telling the audience whether you are continuing the discourse in the same direction, or are going to change it; or are arriving at the final destination.

2.3. Restate important ideas.

2.4. Use of quotations and references to authoritative opinions.

2.5. Use of examples.

2.6. Use of numbers.

2.7. Use of diagrams, graphs and tables.

3. Conclusion.

3.1. Signalling about the conclusion.

3.2. Final summary.

4. General requirements.

4.1. Language convenient for the audience.

4.2. Visuals. Visuals usually help the speaker to organise the presentation, but you should not expect visuals to do all the work.

Some basic tips:

1) *Regarding the number of slides:* 15-20 slides sufficient to understand the idea without comments and sufficient to help the speaker.

2) *The amount of information on a slide:*

1. Avoid the “mega data” slide. Put only the information you need on each slide. Do not try to put too much information on one slide.

2. Try to follow the rule: “one visual = one point”.

3. In general, use 6 to 8 words per line and 5 to 7 lines per slide. Avoid more than 6 objects per slide.

3) *About the language:* Check your spelling. Spelling mistakes displayed on the screen are striking to the audience.

4) *About fonts:*

1. Use Sans serif or Serif fonts for body text and headings, which are easier to read. In some cases, you can write headings in Handwriting.

2. Avoid using Italics, which are difficult to read.

3. Do not write a lot of text in capital letters – they are difficult to read and look like talking to the audience in a very loud voice.

4. Use a sufficiently large font size (18 to 48).

5) *About colours and special effects:*

1. Use them sparingly (limit the use of special effects such as sound effects, bright colours and animations). Pay attention to the range of colours, using the right combination of colours (<https://color.adobe.com/create>; <https://colors.co>; <https://www.colourlovers.com>).

2. Limit the number of colours you use to three, which you can use for contrast and highlight.

3. Use black or navy blue for text on a white or pale background, and white or yellow for text on a dark background.

4. Use only high-quality images for text visualisation (<https://unsplash.com>; <https://pixabay.com>; <https://www.flickr.com>).

5. Use only high-quality icons for visualisation (<https://www.shutterstock.com>; <https://www.freepik.com>; <https://www.flaticon.com>; <https://www.iconfinder.com>).

6) *About the location of the text:*

1. In English, the traditional positioning of text on slides is left-aligned.

2. To avoid large gaps between words due to width alignment, left alignment is also recommended in Ukrainian.

3. Comfortable text spacing between lines on slides is 1.2-1.3.

Microsoft PowerPoint is a popular tool for creating presentations. To make it easier for people with different types of learning disabilities to use presentations, it has several useful features and capabilities:

- **change the font size and contrast:** PowerPoint lets you increase the font size for better readability. You can also change the background and text color to improve contrast;

- **insert images and graphics:** images and graphics can be important elements of a presentation. People with visual impairments may find it difficult to recognize textual information, but they may be able to understand information better through images;

- **audio tracks:** PowerPoint allows you to insert audio tracks, which can be helpful for people with reading or even hearing difficulties;

- **video and subtitles:** if you use video in your presentation, it is important to add subtitles or text descriptions to ensure accessibility for people with hearing impairments;

- **navigation slides and bookmarks:** inserting navigation elements such as hyperlinks allows users to quickly navigate between different parts of a presentation;

- **use descriptive links:** adding descriptions to hyperlinks helps people with visual impairments to navigate more easily;

- **keyboard shortcuts:** PowerPoint provides keyboard shortcuts that allow users to navigate and interact with the application using the keyboard, which can be important for people with motor disabilities;

- **compatibility with screen readers:** PowerPoint supports a variety of screen readers that provide voice output for presentation content;

- **accessibility checker:** PowerPoint has a built-in accessibility checker that helps you identify and fix potential accessibility issues in your presentations.

These features and capabilities make PowerPoint more accessible to a variety of users, including those with disabilities. It's important to keep in mind the needs of different audience groups and strive to provide the highest level of accessibility for all users.

It is very convenient to create interactive presentations using Google Drive by clicking the button on the left side of the Create disc and selecting Google Presentations from the menu. In this menu, you can use a template of existing presentations or create an empty one (Fig. 2.2).

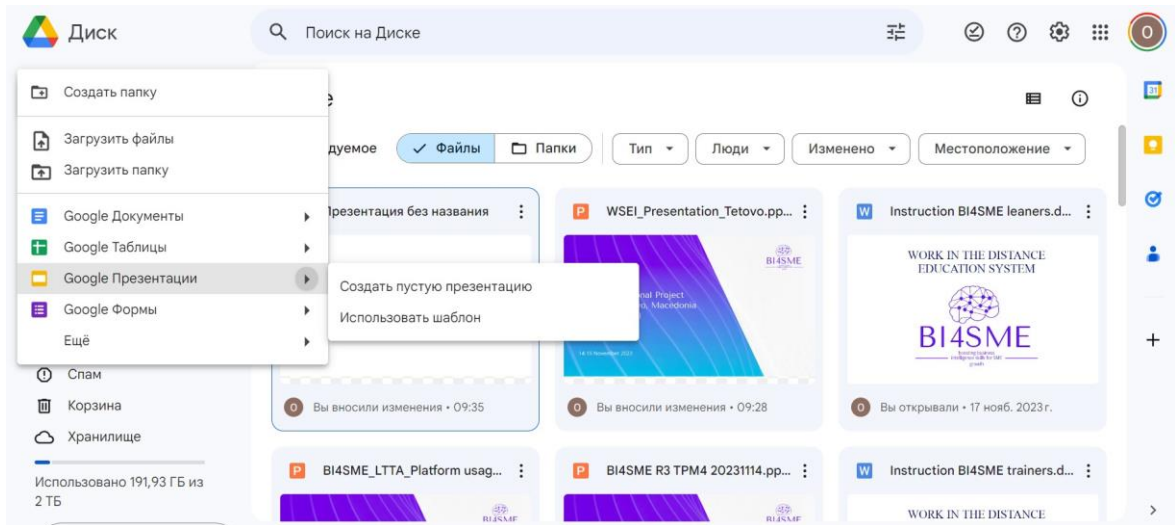


Fig. 2.2. Create online presentations

In the Insert menu, you can find both images from the Internet and YouTube videos, which significantly enhance the visibility and perception of animated material in the context of physical, linguistic, and emotional inclusion (Fig. 2.3).

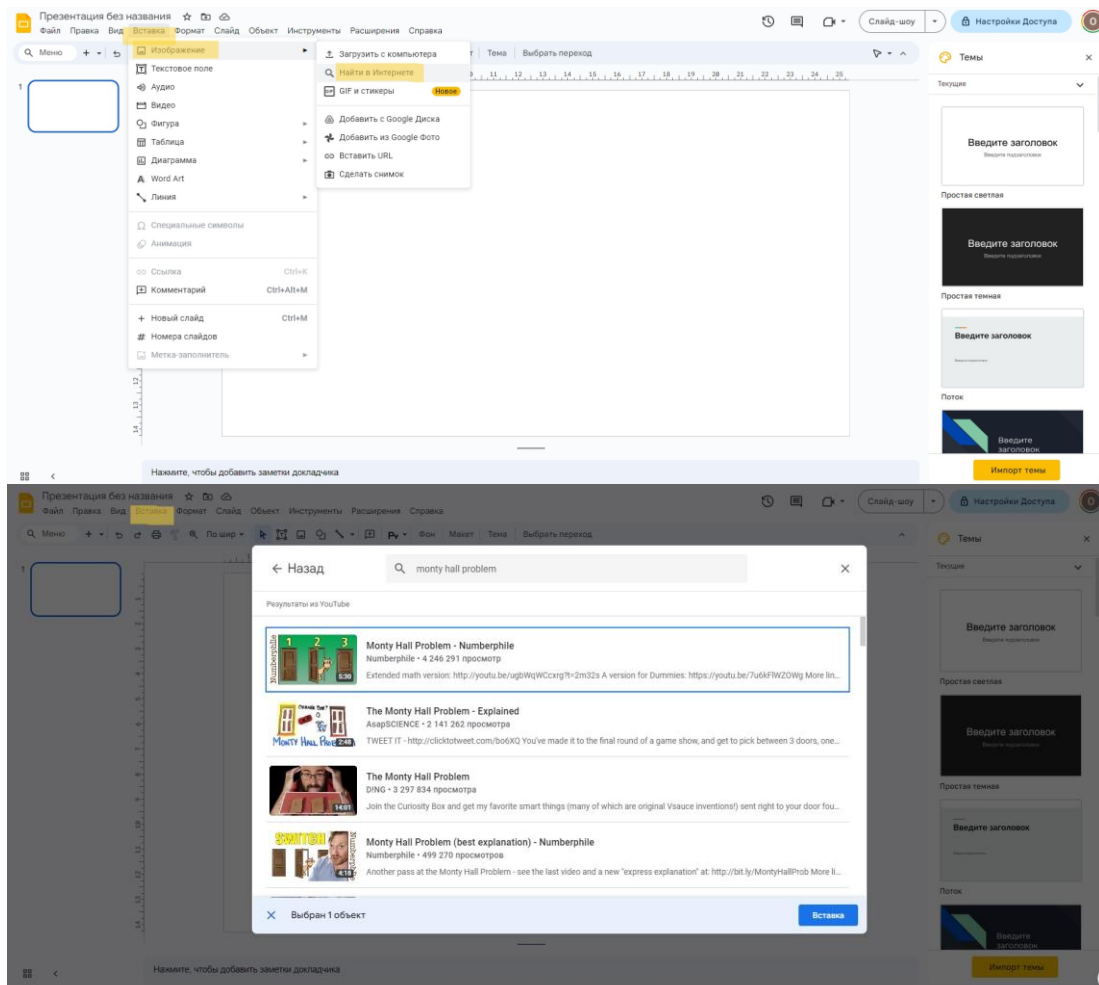


Fig. 2.3. Add animations to presentations

App Edpuzzle (<https://edpuzzle.com>) allows you to add videos to presentations from Youtube, Khan Academy, TED Talks, Crash Course archives or upload your own, monitor video viewing, work in the “flipped classroom” mode (Fig. 2.4).

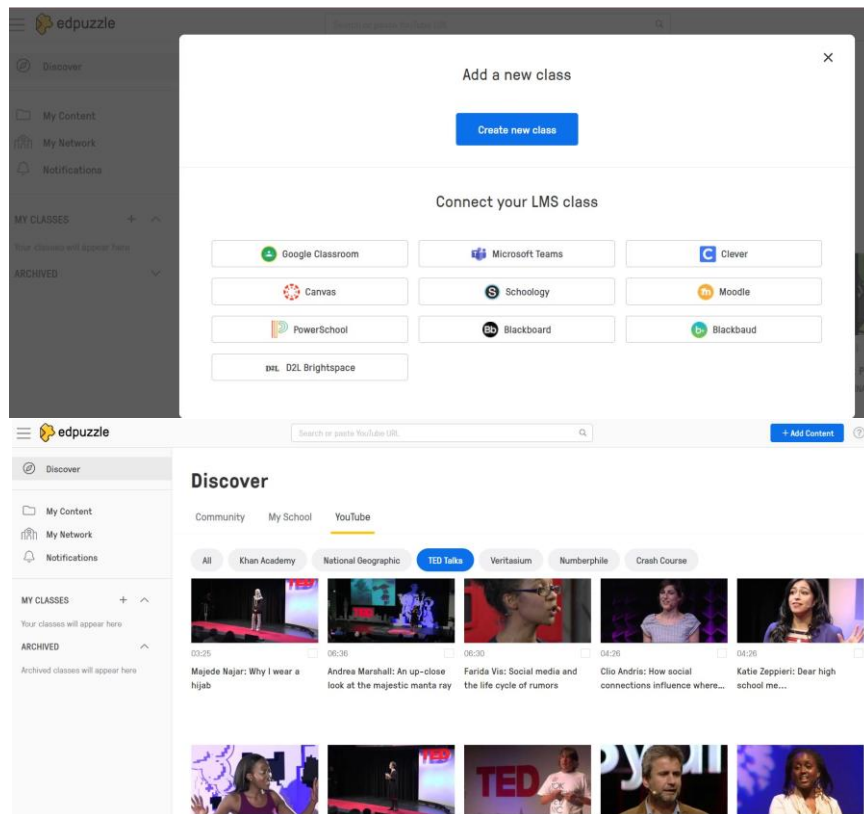


Fig. 2.4. Installing the app Edpuzzle

InVideo tool (<https://ai.invideo.io/workspace>) helps to create short videos on a given topic using artificial intelligence (Fig. 2.5).

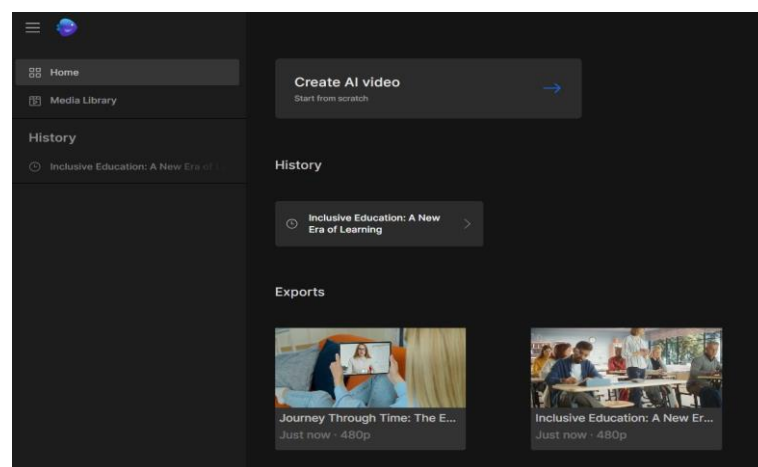


Fig. 2.5. Installing the app InVideo

Such videos can be implemented in presentation materials for greater clarity of the material presented (Fig. 2.6).

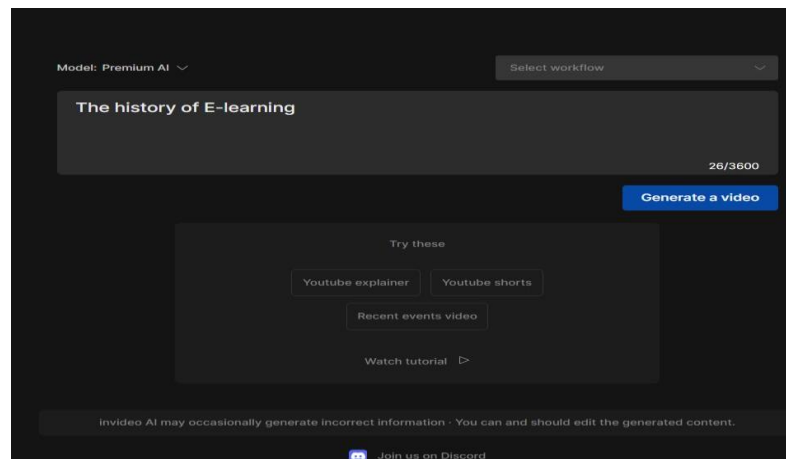


Fig. 2.6. Example of InVideo content generation

The main resources for creating online presentations and videos for effective teacher-student communication in inclusive education are summarised in annex D.

3. Measuring the results of inclusive education

3.1. Main control methods

In inclusive education, assessment and verification of learning outcomes are important elements of the educational process²², without which full interaction between a student and a teacher is impossible. Several types of control are used in the educational process: previous, current, thematic and final (Table 3.1).

Table 3.1. Types of control (checking and evaluating results)

Type	Characteristics
1. Previous	It is conducted for diagnostic purposes before studying the subject. Such control makes it possible to determine the readiness of a student with special educational needs to master the course content, to identify the level of formation of educational and cognitive skills for corrective actions.
2. Current	It is carried out at all stages of the student's study of the content of the current topic. The current check is accompanied by verbal assessment, and to encourage and stimulate learning and cognitive activity, complete answers are evaluated by points.
3. Thematic	It involves assessing learning achievements at the end of one or more programme topics (sections). Grades by topic can potentially be assigned automatically, taking into account current grades, learning activity, and independence of learning.
4. Final	It is carried out at the end of the semester / academic year or at the end of the course (may consist of the results of current and thematic control, or be conducted separately in addition to the previous ones).

Source: compiled based on ^{23, 24, 25}

²² Сак, Т.В. (2011). Індивідуальне оцінювання навчальних досягнень учнів з особливими освітніми потребами в інклюзивному класі: Навч. курс та наук.-метод. посіб. К.: Видавничий дім «Плеяди». 168 с.

²³ Сеньовська, Н.Л. (2021). Інклюзивне навчання у закладах вищої освіти під час карантину. Інклюзивна освіта: ідея, стратегія, результат: Матеріали Всеукраїнської міждисциплінарної науково-практичної конференції, 160-163. http://dspace.tnpu.edu.ua/bitstream/123456789/18723/1/43_Senovska.pdf;

²⁴ Сак, Т.В. (2011). Індивідуальне оцінювання навчальних досягнень учнів з особливими освітніми потребами в інклюзивному класі: Навч. курс та наук.-метод. посіб. К.: Видавничий дім «Плеяди». 168 с.;

²⁵ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

Given the different target groups of inclusion (annex B), it is worth considering that it is advisable not only to adapt the assessment of learning outcomes for each of them, but also to choose the most optimal number of them. For example, for students with intellectual disabilities, hearing or visual impairments, older students, it is recommended to conduct preliminary and current control by topic, in which the teacher will determine their progress in mastering the course step by step. The overall grade for the course can be obtained as a result of weighted average results in terms of individual topics or as a cumulative grade, depending on the grading scale used in the course. It is unlikely to be appropriate for students with varying degrees of disability, illness and emotional disorders to take a comprehensive test or examine them on all course issues at the end of their studies, exposing them to unnecessary stress. Similar controls can also be applied to students living near the war zone, working students or those who have lost relatives.

As for motivated and gifted students, foreign students, there should be much more types of control for them, so that they understand the importance of their involvement in the course and the teacher's interest in monitoring their progress in various forms, so there can be as many as three or all four types of control (Table 3.1). Gifted students may be given even more complex assignments that focus on creativity, development of both hard and soft skills.

The effectiveness of teaching different groups of students is determined by control methods – ways of interconnected activities of the teacher and the student that allow to identify and evaluate the content and nature of student achievements in the relevant course.

Recommended methods for measuring learning outcomes in inclusive education include²⁶:

1. **Tests** refer to control and measurement materials when a student is asked to select one or more correct answers from a list of options (e.g., from 3 to 10). Tests are well suited for superficial checks of the level of learning for working students, students with problems accessing the Internet, and foreign students, as the tests can be easily translated into a foreign language and provide instant results after students take the test at a convenient time.

2. **Portfolio** as an innovative form of assessment and information accumulation is a way of recording, accumulating, and evaluating individual student achievements over a certain period. Portfolios allow you to assess the quality of learning in a multifaceted and multidimensional way (assessment of mental activity, interdisciplinary skills, ability to raise a problem, solve non-standard tasks, perseverance in achieving results, etc.) This type of knowledge test is suitable for students with different types of disabilities, as they can send answers (text, audio, video, pictures) to the teacher in a format convenient for them, which he or she accumulates for a more complete assessment at the end of the course.

3. **Written assignments** in various formats – from open-ended thematic questions to essays on a problematic topic. In the context of inclusive learning, it is important that the teacher is aware of the potential of students to give detailed answers to written assignments, which takes time, given the various challenges faced by Ukrainian students today (blackouts, unstable Internet connection, combining work and study). This form of control is more suitable for gifted students, foreigners, older students who are highly motivated to learn, and students with hearing impairments.

4. **Oral questioning**, which can be replaced in the online format, and solo video, when a student with special educational needs records answers to the teacher's questions in accessible formats and

²⁶ Сак, Т.В. (2011). Індивідуальне оцінювання навчальних досягнень учнів з особливими освітніми потребами в інклюзивному класі: Навч. курс та наук.-метод. посіб. К.: Видавничий дім «Плетяди». 168 с.

sends them in various messages. This format of control is well suited for students with visual, written, numerical or physical learning difficulties. Student discussion is also considered an effective form of assessment. This is a great way to combine interaction and active learning, and to get a non-standard assessment. It can be asynchronous on a discussion board (e.g., Padlet) or synchronous in an online meeting (group work). You can ask students to participate in debates, critique opponents, documents, texts or web pages, and explain how they would solve a problem posed by the teacher.

5. **Project defence** is independent development and subsequent defence of a project on a chosen topic by students. When developing projects, a student with special educational needs can be an organiser, author and developer. In such an assessment, it is important to provide students with clear instructions on how to work on the project, and if it is intended to be a group project, to make sure that individual students, for example, with disabilities, can join the teamwork asynchronously and do not feel excluded from the group of other students.

6. **Calculation and analytical tasks**, which, depending on the course, take the form of problems, analytical notes, detailed answers with illustrative proofs, etc. Such tasks can cover both individual course topics and be offered to the student as a result of all the material covered as a comprehensive calculation work that summarises the acquired knowledge and skills. This form of knowledge testing is also well suited to gifted students who are motivated to learn, but may not work for students with physical, intellectual, written or numerical learning difficulties, students who do not have enough time to complete complex work due to their full-time employment.

In general, experts in inclusive pedagogy advise focusing on the needs of the entire student group²⁷, for which it is advisable to formulate multi-level tasks that provide a choice, and allow students to present material in different ways (verbally, visually, audibly), as well as accept tasks from them in different formats. The student has the right to choose the complexity of the test, the complexity and volume of homework²⁸. In this approach, the relationship between aspirations and achievement becomes a special focus of the teacher's work with an inclusive group of students. A good way to encourage students to communicate and interact constructively with each other is to allow peer assessment and comparison of work.

3.2. Feedback from students

The idea of feedback should be embedded in every course, especially in the online format. Traditionally, feedback is associated with a grade (midterm or final). The absence of feedback or the provision of low-quality feedback can reduce student motivation (frustration, dissatisfaction with the learning process). Without quality feedback, students may also be unaware of their strengths. Good, regular and high-quality feedback also reduces transactional distance, which is the sense of space between the teacher and the student, and of course, in an online environment, it increases.

²⁷ Liubchak, V.O., Zuban, Y.O., Artyukhov A.E. (2022). Immersive learning technology for ensuring quality education: Ukrainian university case. 9th Workshop on Cloud Technologies in Education. CEUR Workshop Proceedings, 3085, 336-354; Ifenthaler, D., Sampson, D.G., Isaias, P., Gibson, D.C. (2023). Open and Inclusive Educational Practice in the Digital World. Cognition and Exploratory Learning in the Digital Age. Springer. <https://doi.org/10.1007/978-3-031-18512-0>; Анохіна, О.А. (2022). Brichlink Studio як засіб роботи з леґо-технологіями в освітній діяльності. Освіта осіб з особливими потребами: виклики воєнного часу: Матеріали VIII Міжнародного конгресу зі спеціальної педагогіки та психології (19-20 жовтня 2022 р.). Київ, 13-18. <https://ispukr.org.ua/?p=9597>; Мірошнікова, А. Сім прийомів, які допоможуть вчителю інклюзивного класу. <https://osvitoria.media/experience/sim-pryjomiv-yaki-dopomozhut-vchytelyu-inklyuzyvno-go-klasu>

²⁸ Сак, Т.В. (2011). Індивідуальне оцінювання навчальних досягнень учнів з особливими освітніми потребами в інклюзивному класі: Навч. курс та наук.-метод. посіб. К.: Видавничий дім «Плетяди». 168 с.

4. Technical support for the inclusive educational process

4.1. Using Microsoft Teams tools to develop inclusive digital courses

Technical support for the inclusive educational process within the framework of the AFID project will be provided through the Microsoft Teams corporate platform, whose technical capabilities ensure the creation of an inclusive space for learning and communication of participants in the educational process.

Microsoft Teams is a collaborative communication tool that enables real-time collaboration and remote meetings. To make it easier for people with disabilities to use Teams, the platform includes a number of useful features and capabilities:

- **responsive design and interface:** Teams has a responsive interface that allows users to customize the look and feel of the app to suit their needs. This includes the ability to change the font size, background color, and other settings to improve accessibility;

- **screen readers:** Teams is fully compatible with screen readers that help blind or partially sighted users interact with the interface and content;

- **subtitles and translation:** Teams provides the ability to add subtitles during video calls and live events. In addition, the built-in translation feature helps users who speak different languages communicate;

- **zoom in on text and subtitles:** Teams allows users to zoom in on chat text and view subtitles in a larger format for easier reading;

- **alternative input methods:** for people with mobility limitations, Teams supports alternative input methods, such as voice control and dictation;

- **accessibility templates and guides:** Microsoft provides templates and guides for creating accessible documents and presentations that you can use in Teams;

- **support for keyboard shortcuts:** Teams provides keyboard shortcuts to control the app through the keyboard, which helps users with motor disabilities;

- **notifications and alerts:** Teams can send audible and visual notifications, allowing users to receive messages even if they have hearing or visual impairments.

Access to educational materials is open to both higher education students of the universities that develop the courses and students from other universities, which can be realised by registering for the course and providing separate access to it (through a Microsoft account, other personal email of the student or through a link).

There are three ways to add a user:

1. Through the main menu of the team, which is carried out according to the following chain of actions: click on the “...” icon next to the team name (in our sample, the name “Project Page”) and select the “Add Participant” item. After that, you will be prompted to choose a role for the new participant: “Students” or “Teachers”. In the user search field, enter the name and surname or email address of the corporate platform user, select the required person, and click “Add” (Fig. 4.1).

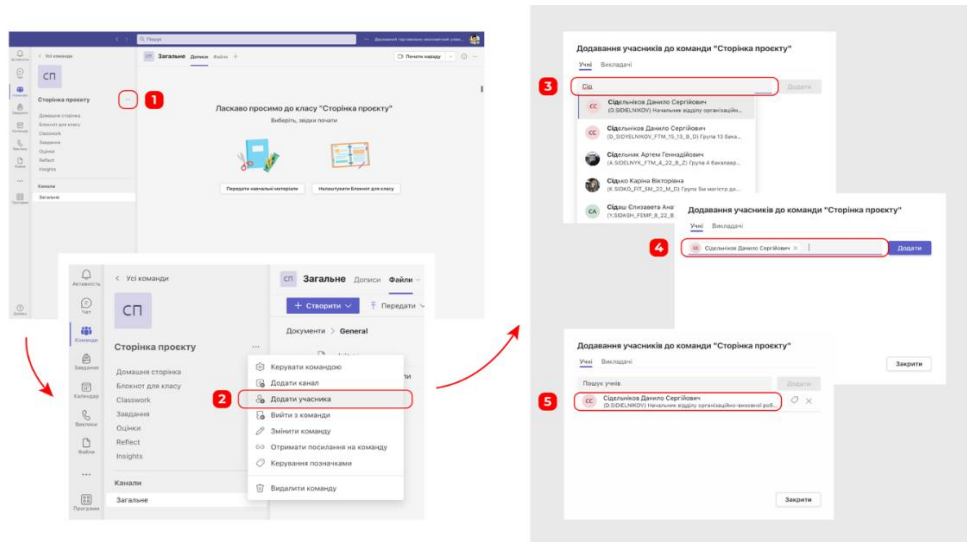


Fig. 4.1. Adding a new user through the main command menu

The added participant will receive an email notification about joining the team, a link that will offer to go to Microsoft Teams and automatically log in to the team (Fig. 4.2).

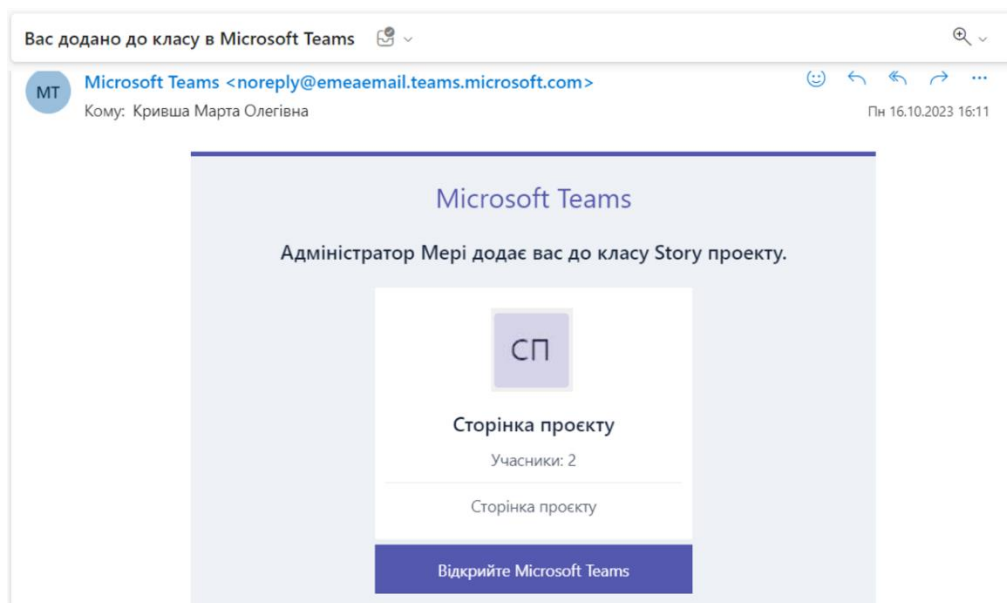


Fig. 4.2. Notification of joining the team

5. Adding a user using a link through the main team menu follows the same chain of actions as in the first method, but when using this method, you must click “Get a link to the team” from the options offered. After these actions, a window with a link will appear, which can be copied and sent by e-mail or via messenger (Fig. 4.3).

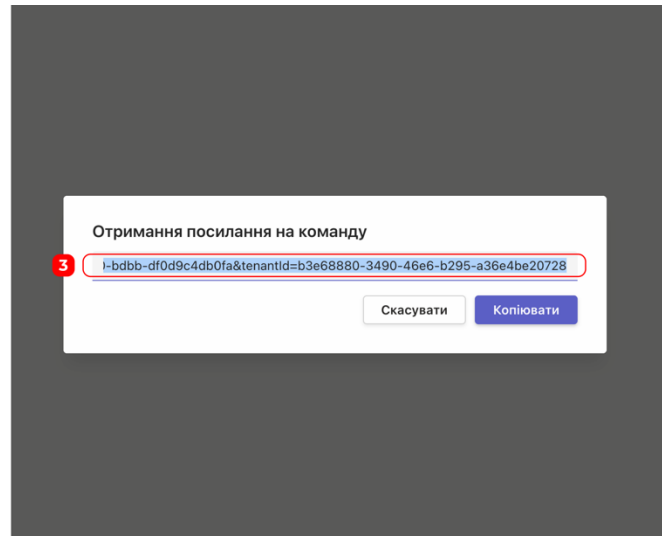
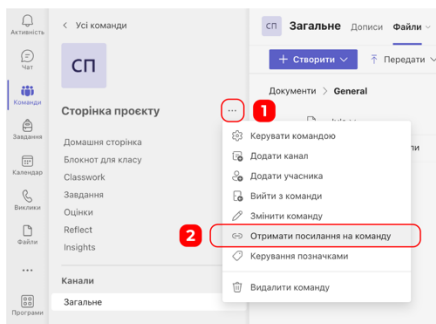


Fig. 4.3. Create a link to join the team

With this method of adding, by opening a link in their email, the user logs into Microsoft Teams and receives a request to join, after which a request to add a participant will be sent to the team owner (Fig. 4.4).

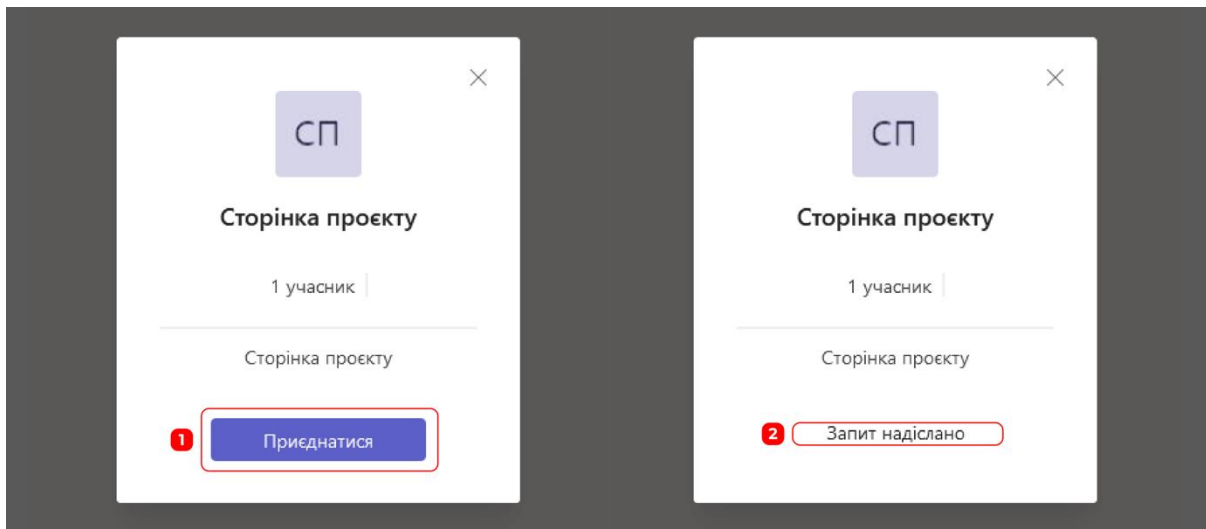


Fig. 4.4. User request to join a team

The request for addition is displayed by the team owner in the “Activity” window, where they can accept or reject the new member (Fig. 4.5). As a result, the new member will receive an email notification about being added to the team.

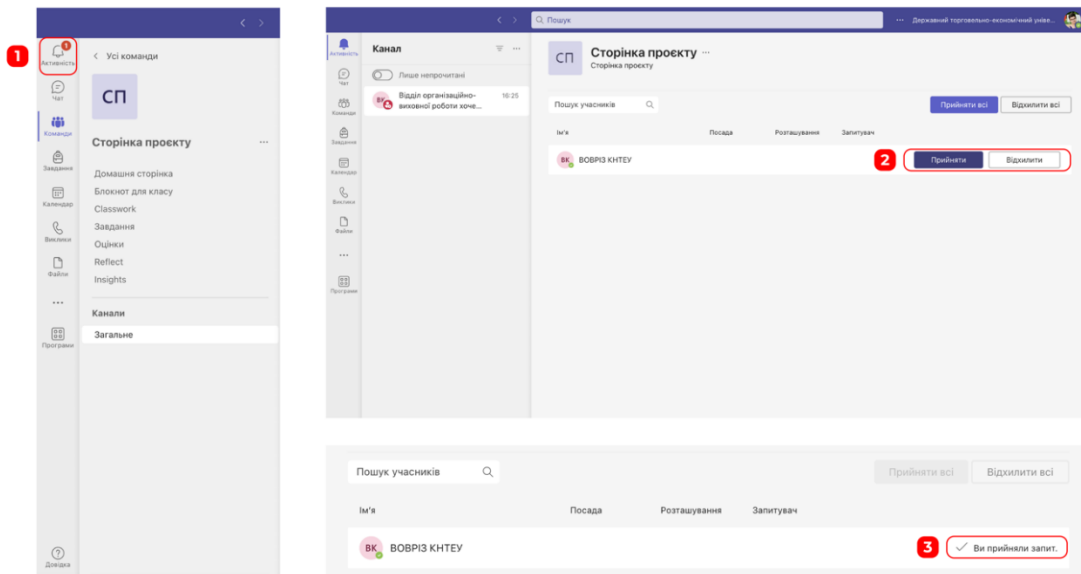


Fig. 4.5. Confirmation of the request to join the team

6. The third method repeats the chain of previous actions, but involves selecting the “Manage team” option. In the window that opens after this transition, you can see a list of all team members and select the “Add member” function, after which the joining mechanism from the first method is repeated (Fig. 4.6).

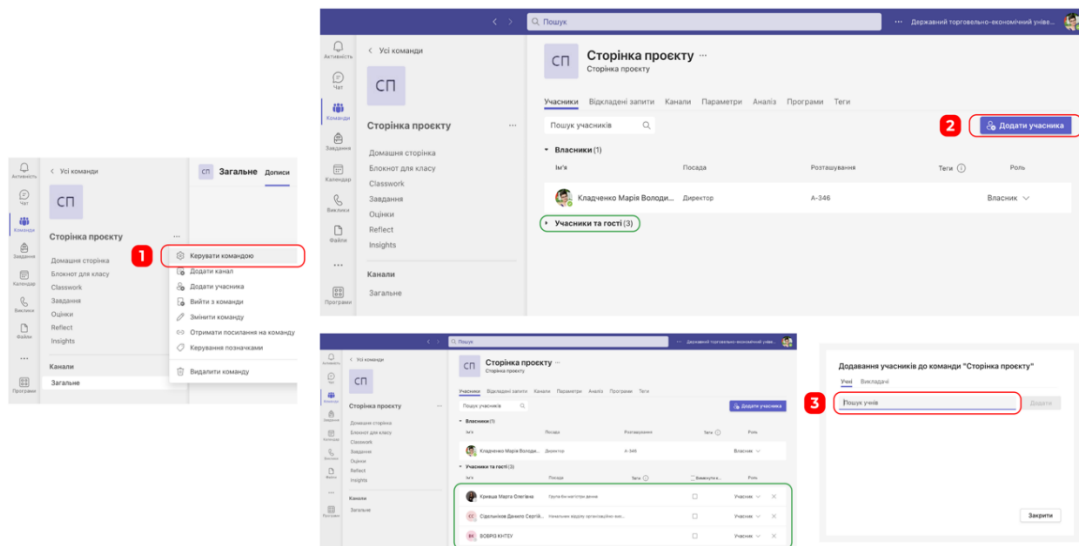


Fig. 4.6. Adding a team member via the Manage Team option and viewing all team members

Thus, the team owner can manage the addition of new team members using one of the most convenient methods. Also, in the Manage team window, you can change the roles of the participants “Participant / Owner” and remove users from the team.

Adding a user is carried out by analogy and includes the same actions as all three methods. In this case, the system independently identifies that the email address added to the search window does not belong to the university on whose platform the team is hosted and indicates the user as a “Guest”. Also, a warning is displayed that this user may appear in the list of team members after some time, but the request for the user’s email and confirmation of his/her joining is as fast as when using a Microsoft account (Fig. 4.7).

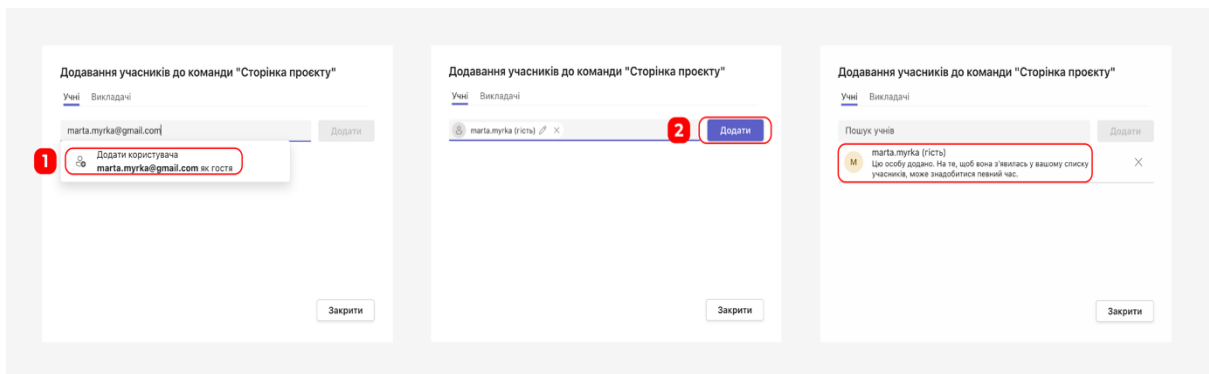


Fig. 4.7. Add a participant without a Microsoft account

After that, the user receives an invitation to join the team by email, logs in through his/her own email and gives permission for the course developer to use the user profile data (Fig. 4.8).

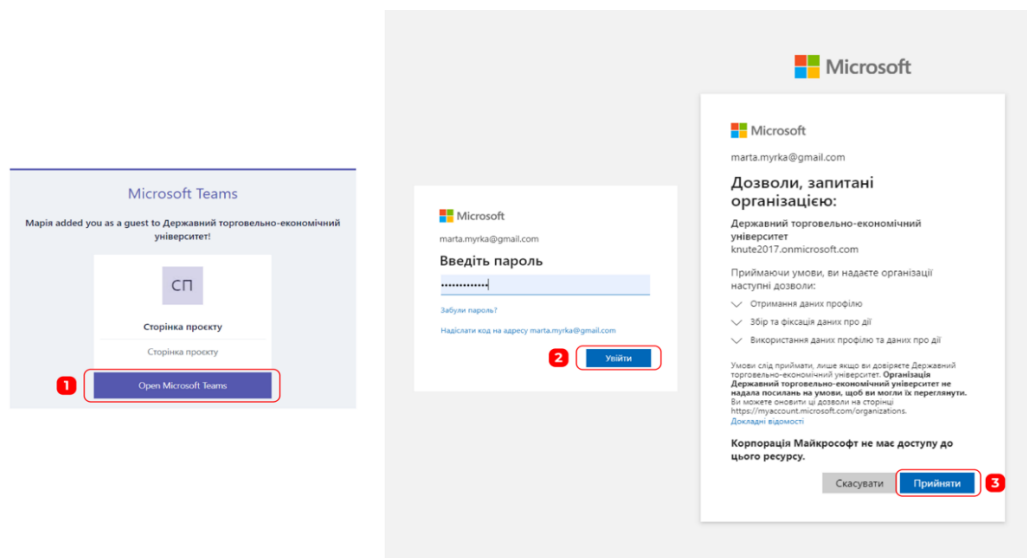


Fig. 4.8. Joining the team of a user without a Microsoft account from a university-developer

After a new user is added to a course team, they are granted access to the materials posted in the course team. Microsoft Teams tools allow you to create various types of materials, post links and upload files, which will ensure a variety of teaching methods and open communication between participants in the educational process, structured materials, completion of tasks and feedback on educational courses. In particular, there is a possibility to use a variety of downloadable applications, such as creating interactive surveys, using Kahoot! (Fig. 4.9).

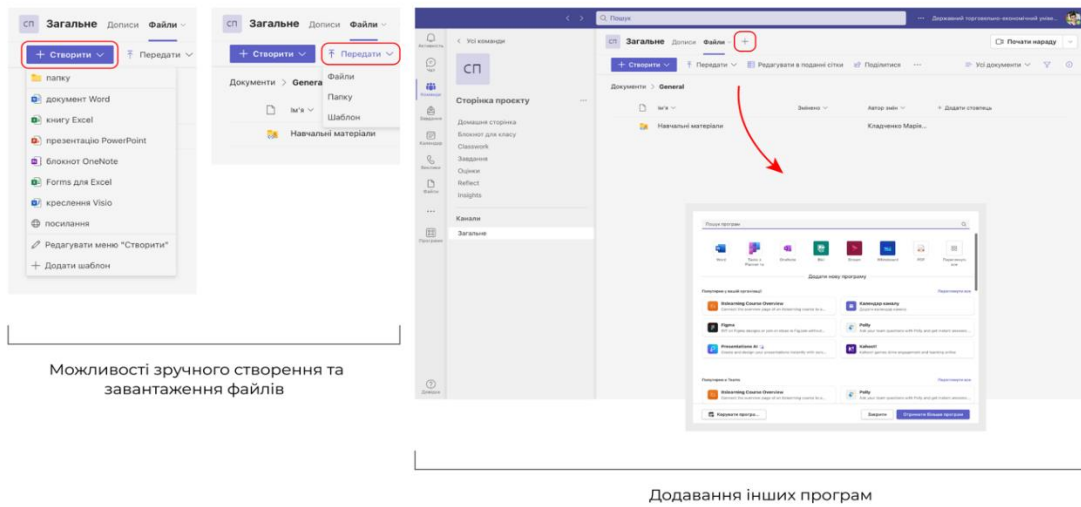


Fig. 4.9. Download and create Microsoft Teams files, use additional apps

It should be noted that files uploaded to the team have different security features. Using a personal Microsoft account, if it is not linked to the university, after receiving permission to join the team, provides all the features of the platform. However, logging into Microsoft Teams from a third-party email provides access to open folders and view their contents, but, for example, to watch a video, you need to send a request for each individual video and get permission to view it from the owner of the materials. All of this is done automatically in a few clicks, but it can take some time to wait for confirmation from the team owner. In general, this is solved by creating a personal account with Microsoft, which takes a few minutes and is simple and free.

Another tool for protecting digital content is to set up a download ban on materials uploaded to the platform, which is an element of preserving the copyright of the developers of course materials. Setting up a download restriction is done in several steps, which requires:

1. Open the video (by clicking on the name of the video, the file will automatically open in OneDrive, where the video is stored with all the settings for it) and go to the “Share” button, then select “Access Control” from the list of options. In the access control window, click on “...” and select “Advanced Settings” (Fig. 4.10).

2. In the SharePoint detailed settings window, there is a list of user categories through which you can change permissions for individual user categories. In the basic form, all three categories “Visitors”, “Owners” and “Participants” have the properties of a “parent” folder where all materials are placed. Therefore, to set unique permissions, you should click on the “Stop inheriting permissions” button (if the settings for linking to the “parent” folder are configured differently and there are no inscriptions on a yellow background above the user categories, you should immediately follow the steps described below). After the previous permissions have ceased to apply to the material, you can set up new permissions by ticking the box next to the desired category and clicking the “Change user permissions” button. In the new window that opens, you need to tick the box next to “Restricted viewing”, the description of which states that the file cannot be downloaded to personal media (all other boxes need to be unchecked) and confirm your choice (Fig. 4.11).

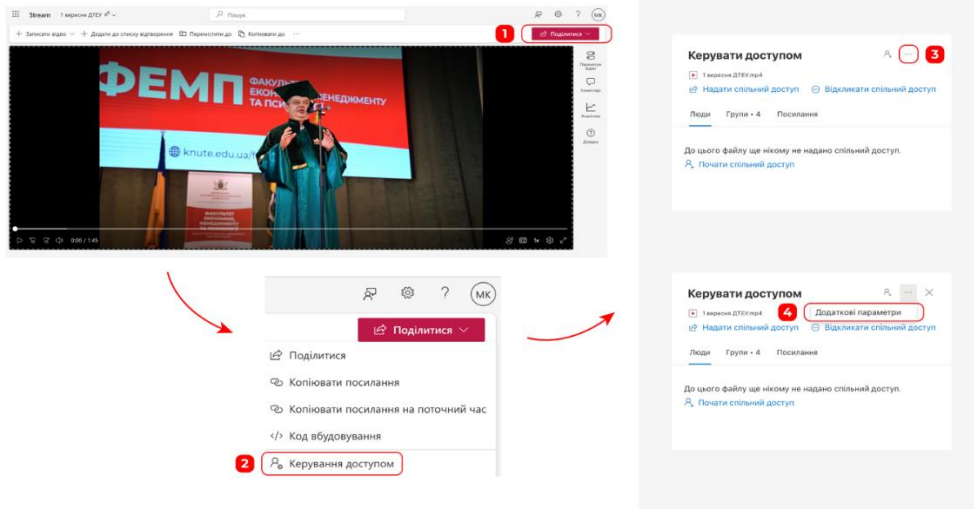


Fig. 4.10. Access control for video

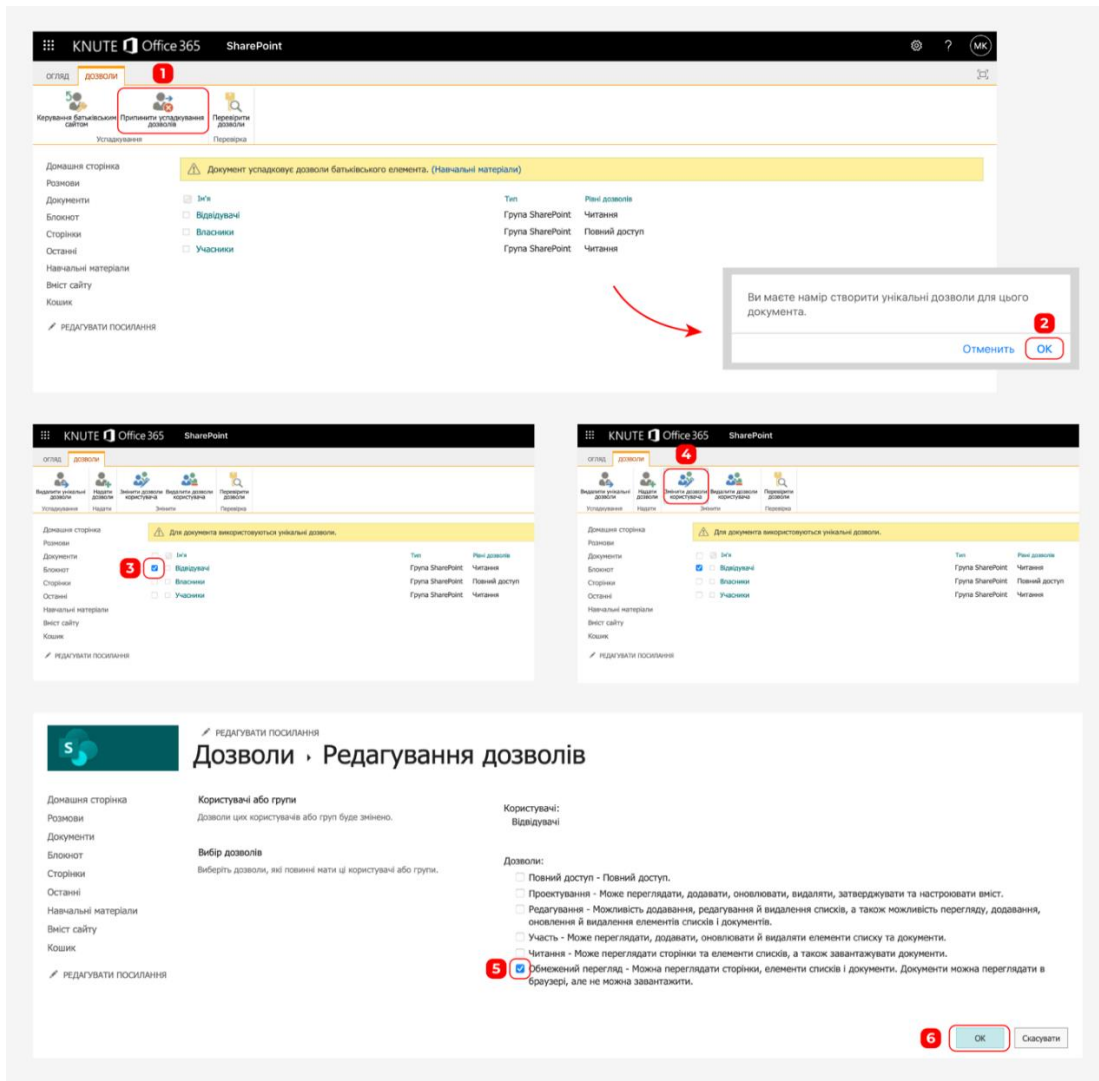


Fig. 4.11. Set unique permissions for viewing course materials

The location of the corresponding elements that provide the ability to download files or indicate its absence is shown in Fig. 4.12.

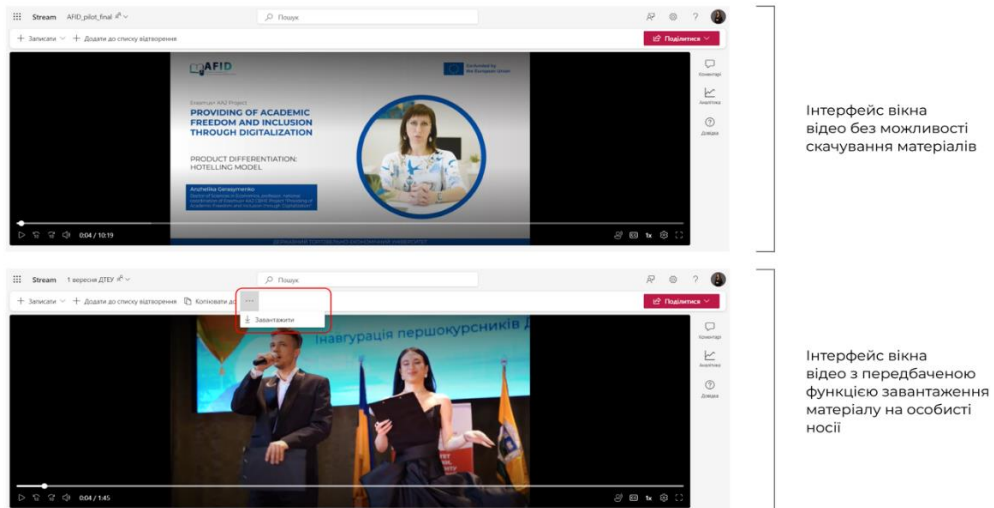


Fig. 4.12. Display the ability to download files

Video content placement and further customisation is supported by built-in video editing features, such as:

- adding chapters;
- decoding video by subtitles;
- the ability to leave a comment;
- entering a video description, etc.

The menu for changing video parameters on the right side allows you to implement all these functions with maximum benefit for the owner and team members, and is visible only to users with editing access.

Thumbnail is a visual add-on that allows you to upload a cover for a video, as well as select it from any second of the uploaded video. This function primarily serves to visually highlight the material and is implemented in a similar way to YouTube (Fig. 4.13).

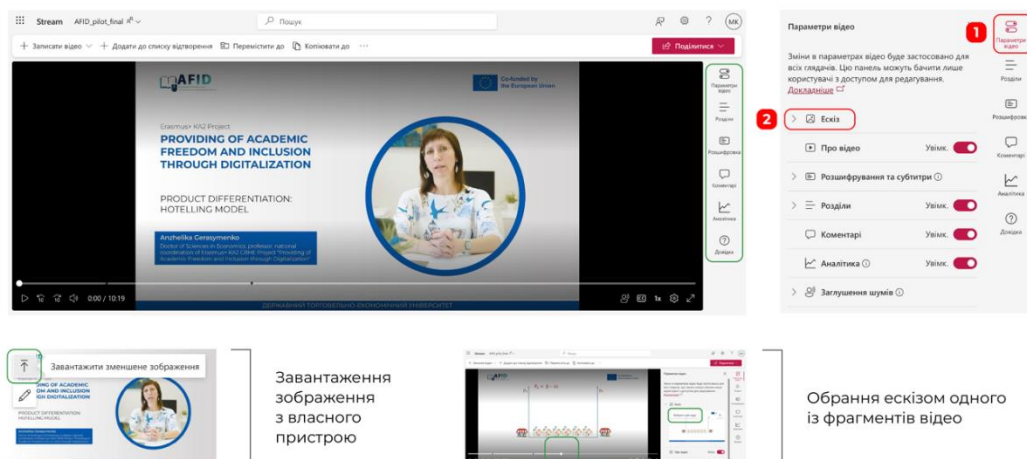


Fig. 4.13. Selecting a thumbnail for a video

Placing a video description allows you to enhance the visuals with text and useful links. Filling in this block is similar to editing text in Word, and the settings window allows you to add boldness, italics, underline text, create a list and numbering, and hyperlinks (Fig. 4.14).

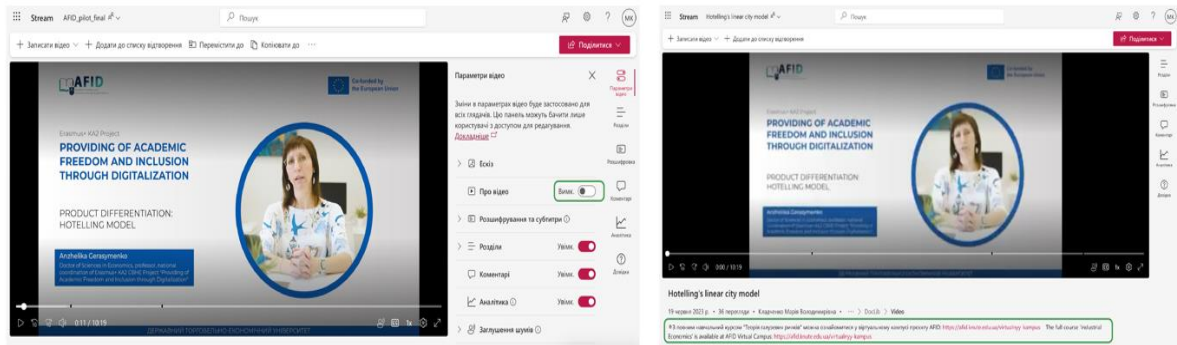


Fig. 4.14. Placing a description below the video

The “Decryption and subtitles” option allows you to add subtitles to videos in the WebVTT (.vtt) format, separately in different languages, which further allows you to use subtitle decryption, which provides the ability to view the video in accordance with its content and easy navigation for people with hearing impairments. Subtitle files are uploaded by clicking the “Transfer” button, which provides options for selecting a subtitle name and a button for uploading a subtitle file. Also, the Microsoft Teams toolkit (the “Create” button) provides for the creation of automatic subtitles for videos, but Ukrainian is not yet supported, only English (Fig. 4.15).

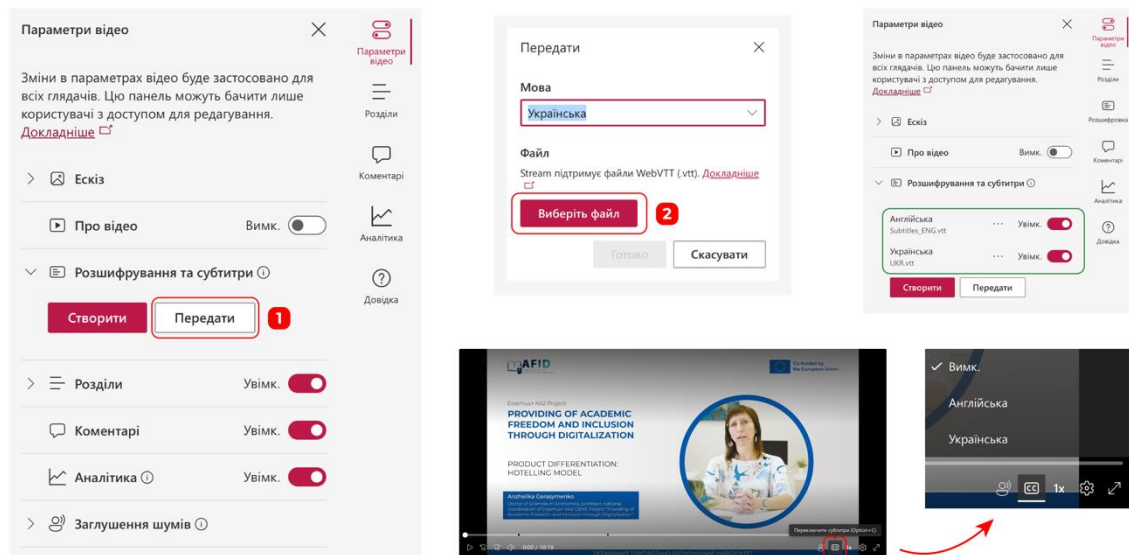
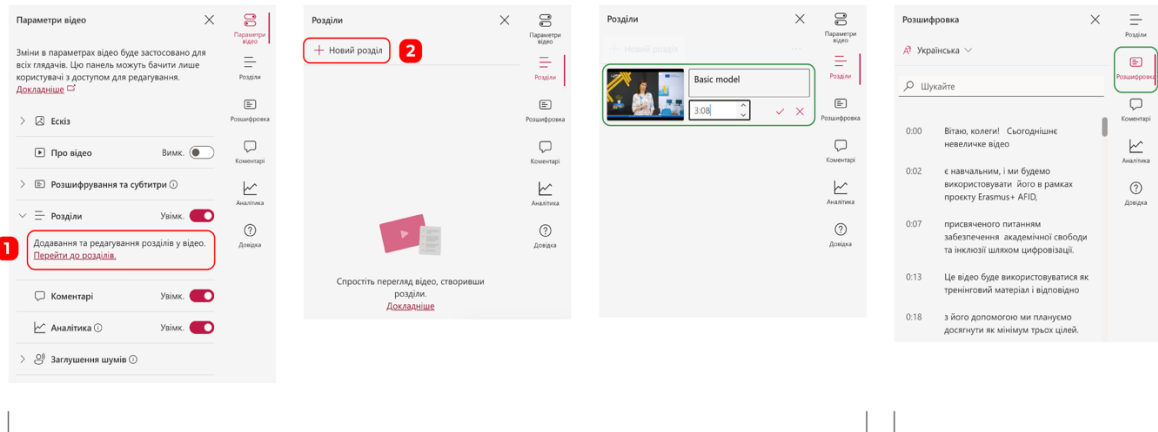


Fig. 4.15. Setting up subtitles

Structuring a video into separate sections is a handy feature that allows you to divide the video material into separate timelines, each of which indicates the “boundaries” of information that corresponds to specific subtopics of the overall lecture. Chapter creation works well in conjunction

with video transcription. Thanks to these features, the user can select the subtopic of the video of interest and then view it in the text (Fig. 4.16).

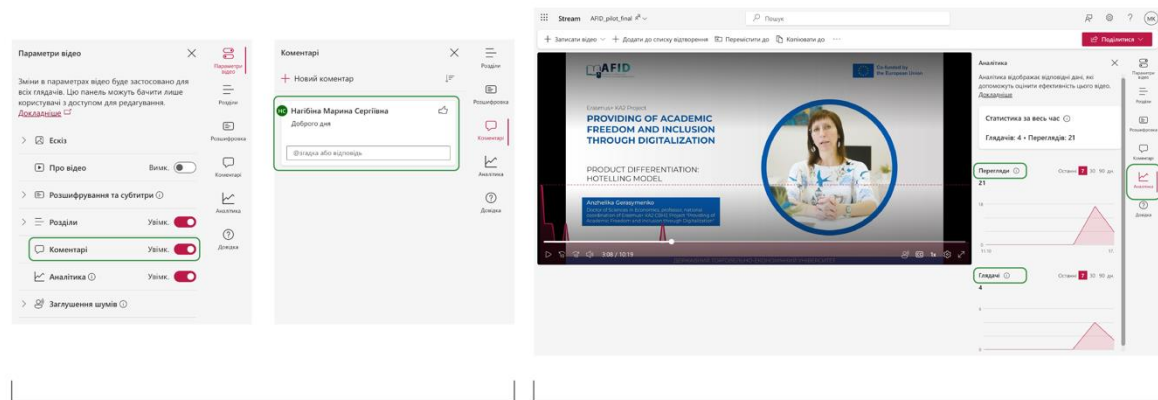


Налаштування розділів відео по темам за часовими відрізками

Розшифрування тексту відео відповідно до субтитрів

Fig. 4.16. Using video sections and decoding

The use of comments allows team members to leave a comment with their own question or suggestion to the course developer and other participants in the educational process. In addition, the Analytics function allows you to track the number of users and video views, which can be useful for analysing the success of the course (Fig. 4.17).



Налаштування та додавання коментарів до відео

Перегляд аналітики

Fig. 4.17. Comments and analytics view

The video display window also contains a number of settings that ensure the inclusivity of video materials, such as switching subtitles on or off and playback parameters (size, colour, etc.), video playback speed, which allows you to make the video slower or faster, and others. The subtitle size setting is available in Small / Medium / Large options, several font colours and rectangular fill under the text, and the ability to set a transparent background under the subtitle text. The video speed setting offers six options, including one basic (1x), one that makes the video slower (0.8x), and four options to speed up the video to a maximum of 2x (Fig. 4.18).

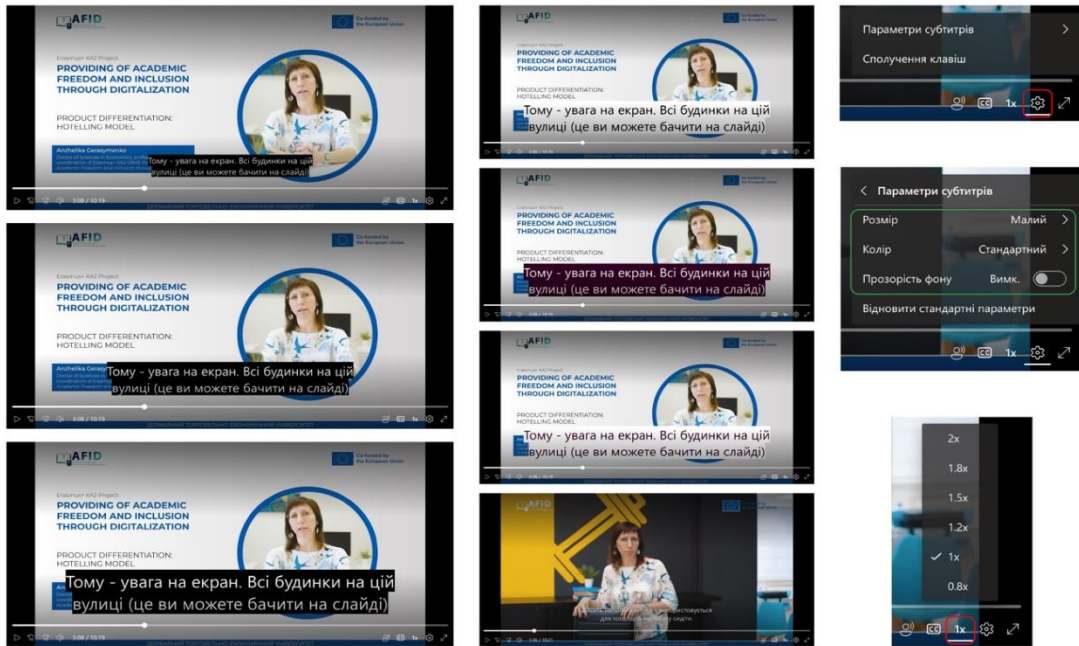


Fig. 4.18. Options for setting subtitles and video playback speed

Thus, the functionality of Microsoft Teams makes the platform convenient and multifunctional for working with video and various formats of educational materials as part of the preparation and implementation of digital courses.

4.2. Digital applications for inclusive learning

In general, digital learning tools for interactive learning can be classified according to different features: assessment tools, collaboration tools, communication tools, video tutorials (annex D). Most of them can be easily used on the Microsoft Teams platform, as clicking on the Apps button opens the Education option (Fig. 4.19), where you can find a variety of digital tools to install (Fig. 4.20).

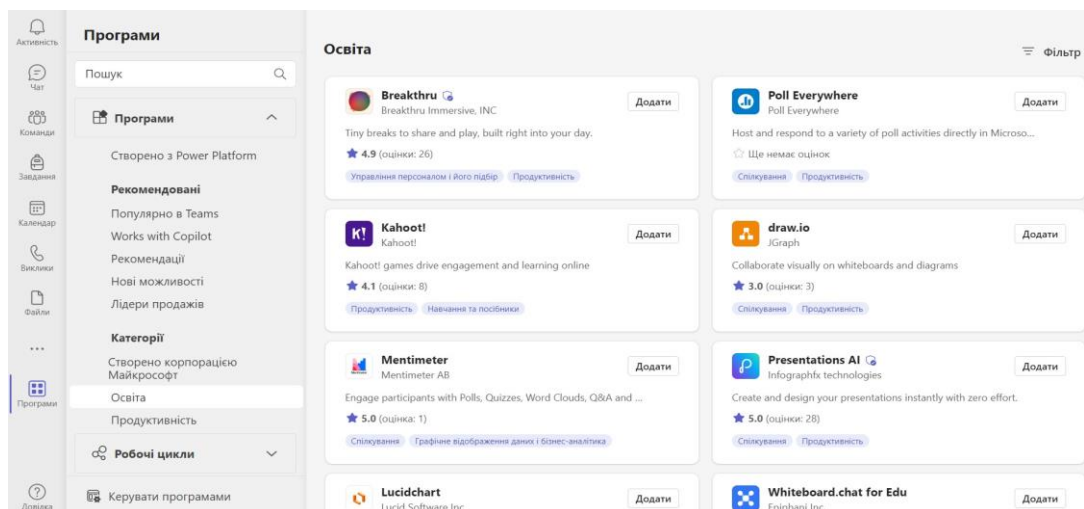


Fig. 4.19. Digital tools for use in Microsoft Teams

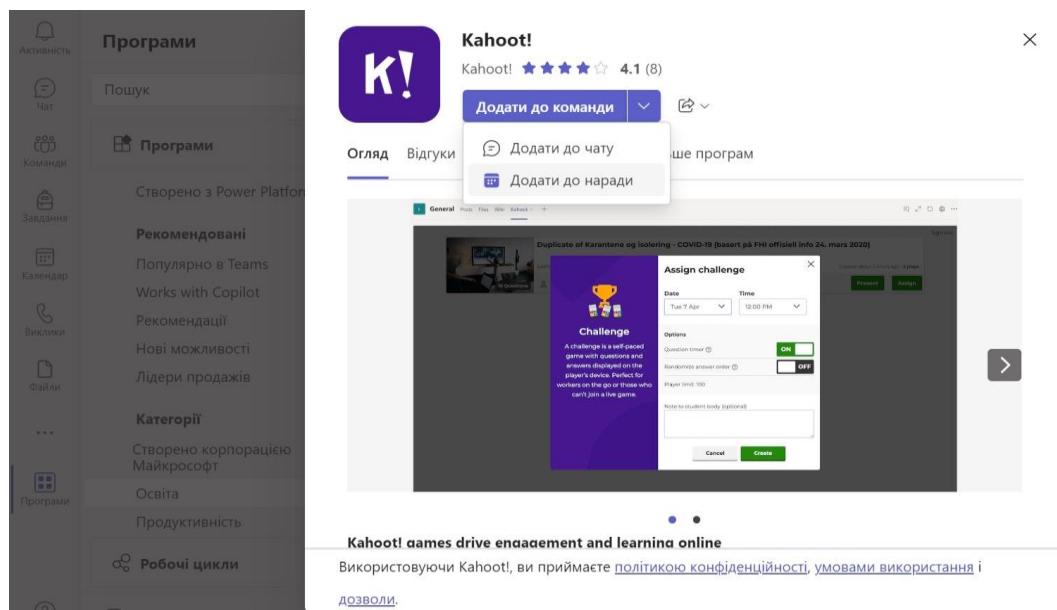


Fig. 4.20. Example of installing the app Kahoot

The “Diia.Osvita” portal, initiated by the Ministry of Digital Transformation of Ukraine and supported by the Swiss-Ukrainian EGAP Programme, has launched several educational series that will deepen understanding of working with students with special educational needs²⁹:

1) “Digital Skills for Teachers” (<https://osvita.diia.gov.ua/courses/serial-iz-tsyfrovoi-hramotnosti-dlia-vchyteliv>) (Fig. 4.21), which demonstrates in an accessible form the methods of creating online presentations, conducting interactive lessons with YouTube, testing and checking tasks, organising learning and communication, working in groups, etc.;

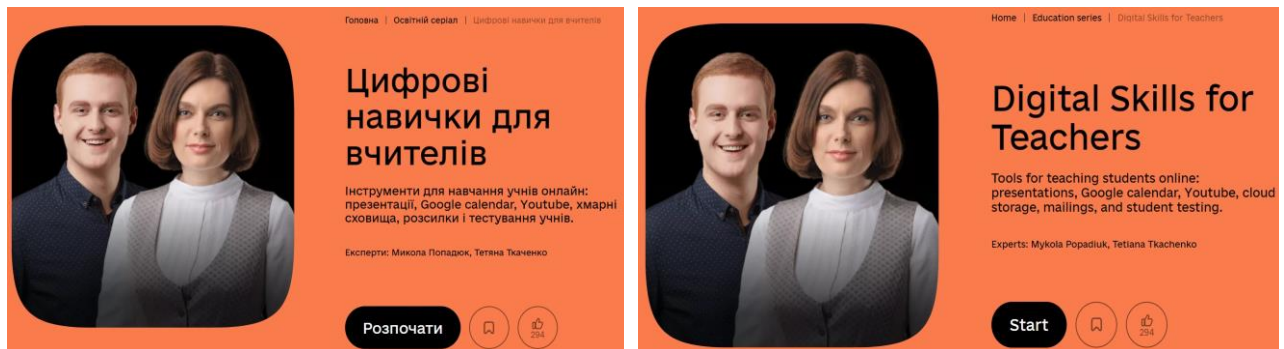


Fig. 4.21. Digital Skills for Teachers

2) “Digital Technologies for people with Disabilities” (<https://osvita.diia.gov.ua/courses/digital-for-persons-with-disabilities>) (Fig. 4.22), which demonstrates in an accessible form the peculiarities of distance education for people with disabilities, the use of Internet technologies for employment of people with disabilities, alternative communication for people with speech impairments, personal development, purchasing the most necessary goods and services, etc..

²⁹ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

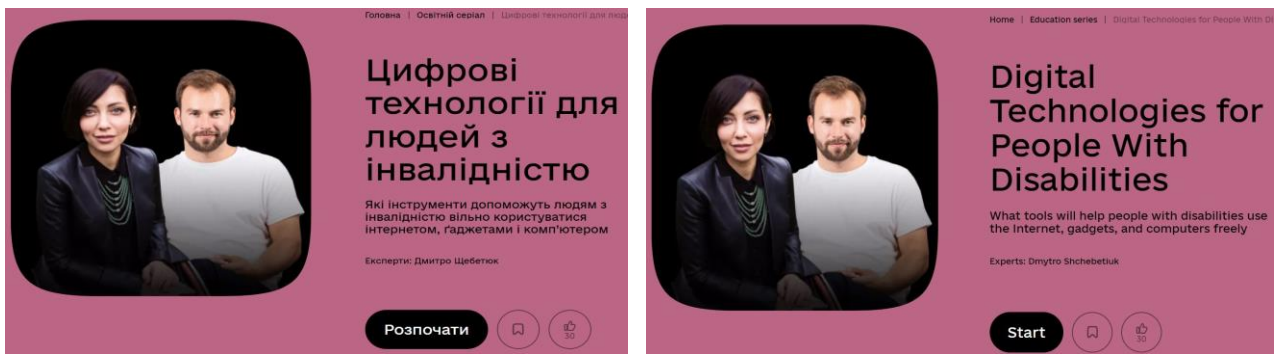


Fig. 4.22. Digital Technologies for people with Disabilities

3) “Basic Digital Skills for the Elegant Age” (<https://osvita.diiia.gov.ua/courses/basic-digital-skills-for-the-elegant-age>) (Fig. 4.23), which provides tips on how to register an account, sign up for social media, choose objective sources of information, search for digital education hubs, etc.

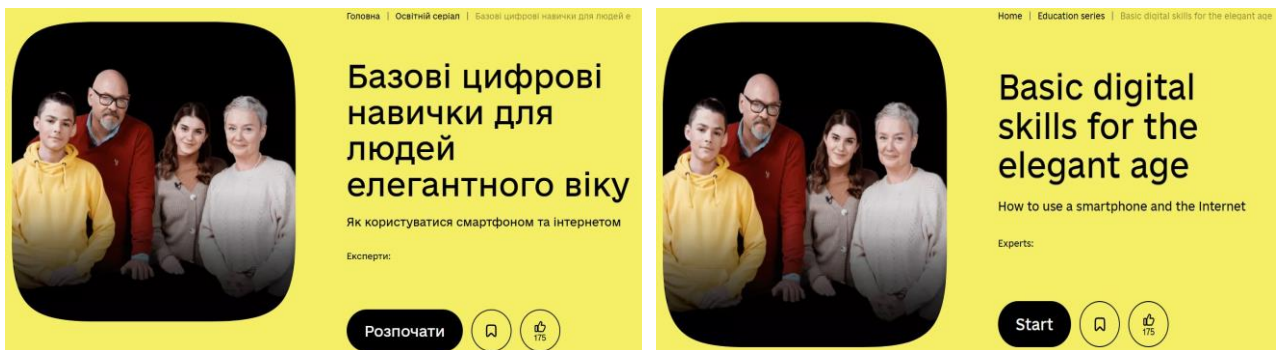


Fig. 4.23. Basic Digital Skills for the Elegant Age

4) “Interactive learning: How to Create Compelling School Lessons” (<https://osvita.diiia.gov.ua/courses/basic-digital-skills-for-the-elegant-age>) (Fig. 4.24), which demonstrates online interactive learning tools in an accessible way: Microsoft Teams, Class, School Lessons, gamification, augmented reality, etc.

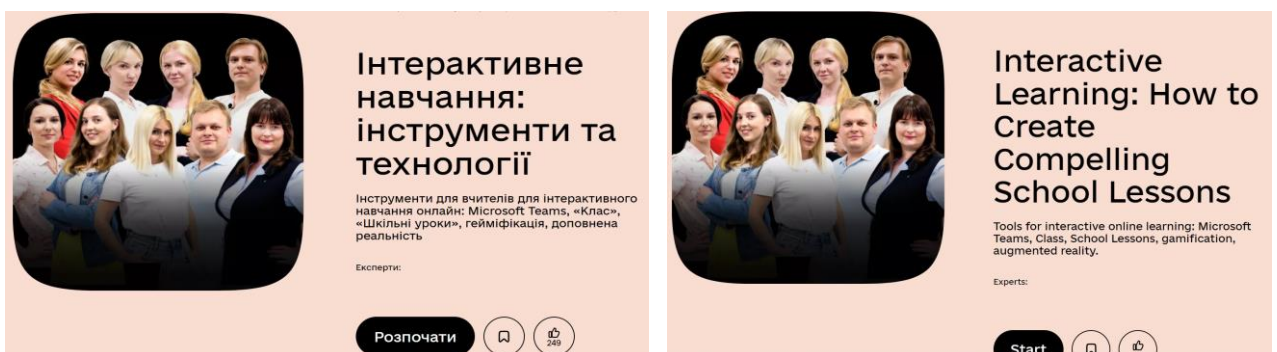


Fig. 4.24. Interactive learning

Today, a variety of digital applications built using artificial intelligence are available for inclusive education, which can help teachers and students communicate effectively³⁰:

³⁰ Інтернет-ресурси для зручної комунікації з учнями в інклюзивному процесі, 2018. <https://naurok.com.ua/post/internet-resursi-dlya-zruchno-komunikaci-z-uchnyami-v-inklyuzivnomu-klasi>; Новітні технології для дітей з особливими освітніми потребами, 2018. <https://naurok.com.ua/post/novitni-tehnologi-dlya-ditey-z-osoblivimi-osvitnimi-potrebam>; Топ-15 онлайн-інструментів, які

1) RHVoice (<https://rhvoice.org/uk-voices>) – speech synthesiser, which is easily installed on personal computers and mobile phones, has two voices (Anatol, Natalia) and allows blind students to work with text (Fig. 4.25). Other synthesisers (Speaking Mouse, Newfon) have metallic and artificial voices, so they are difficult to hear.

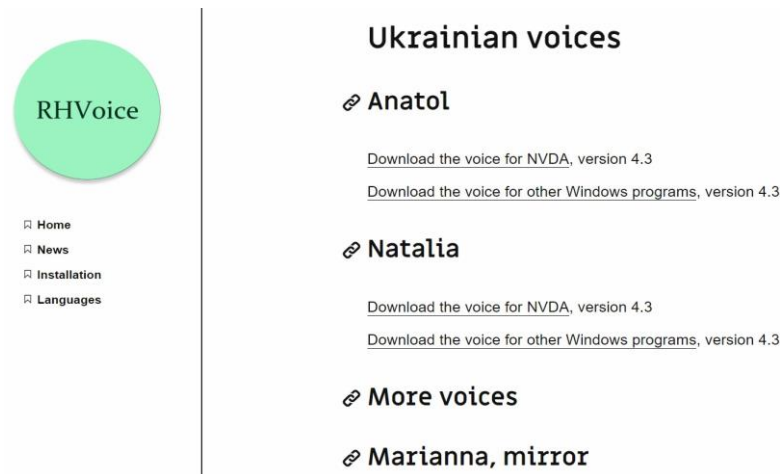


Fig. 4.25. Speech synthesiser RHVoice

2) Screen reader NVDA (NonVisual Desktop Access) (<https://www.nvaccess.org>), which is simply downloaded and used, is free and has a Ukrainian interface (Fig. 4.26), while other analogues are too expensive (e.g. Jaws for Windows, SuperNova Screen Reader).

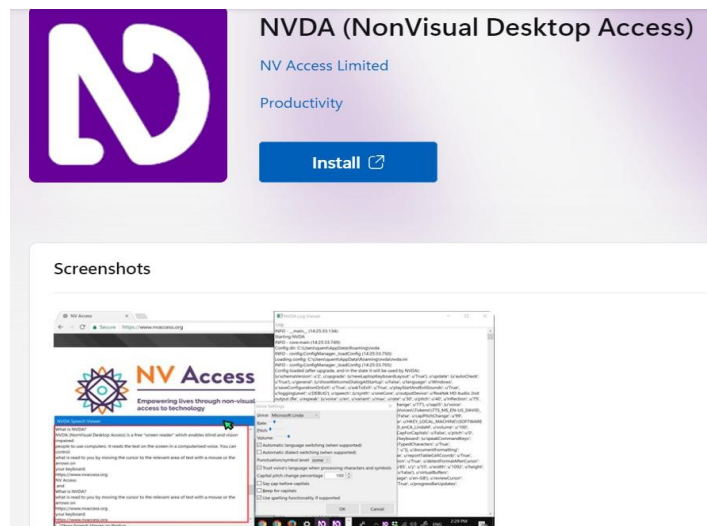


Fig. 4.26. Screen reader NVDA

знадобляться кожному викладачу на дистанції. <https://www.jta.com.ua/knowledge-base/top-15-onlayn-instrumentiv-yaki-znadobliatsia-kozhnomu-vykladachu-na-dystantsiytsi>; Цифрова інклюзія: створено перший у світі україномовний додаток Digital Inclusion для безбар'єрного спілкування всіх, 2021. <https://www.huawei.com/ua/news/ua/2021/18062021>; Цифрова інклюзія: роль технологій у соціальній інтеграції людей з розладами спектру аутизму і порушеннями мовлення, 2020. <https://www.ukrinform.ua/rubric-presshall/3137936-cifrova-inkluzia-rol-tehnologij-u-socialnij-integracii-ludej-z-rozladami-spektru-autizmu-i-porusennami-movlenna.html>; Мобільні застосунки як інструмент допомоги людям з інвалідністю. <https://ck-oda.gov.ua/novyny-cherkaskoyi-oblasti/mobilni-zastosunki-yak-instrument-dopomogi-lyudyam-z-invalidnistyu>

3) «BeMyEyes» (<https://www.bemyeyes.com>) – an app to help the blind and visually impaired. When the app is downloaded and the camera is turned on, a visually impaired person will receive a response from a volunteer and will be able to tell what they see on the smartphone screen (Fig. 4.27).

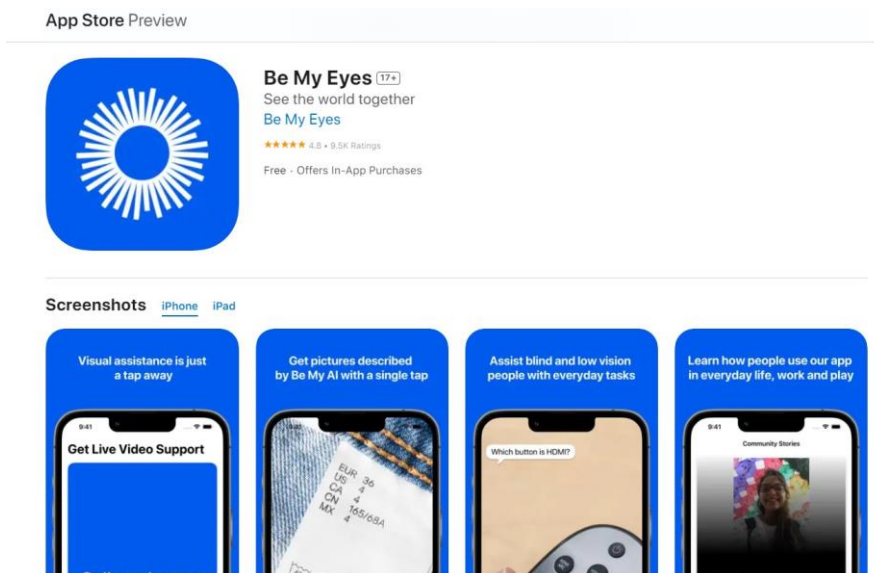


Fig. 4.27. App BeMyEyes

4) «Understand me» – an app for alternative communication for people with speech impairments (<https://www.androidlist-russia.com/item/android-apps/642616/pojmi-menya-free/download>), which works using picture icons with professional voice acting. However, only the simplest information can be transmitted in this way (Fig. 4.28). Other similar communicators include Ninotchka, Dolphin, Autism.Communication, Sesame, the LINKa project (a number of free programmes for people with different types of disabilities), Govori.org.

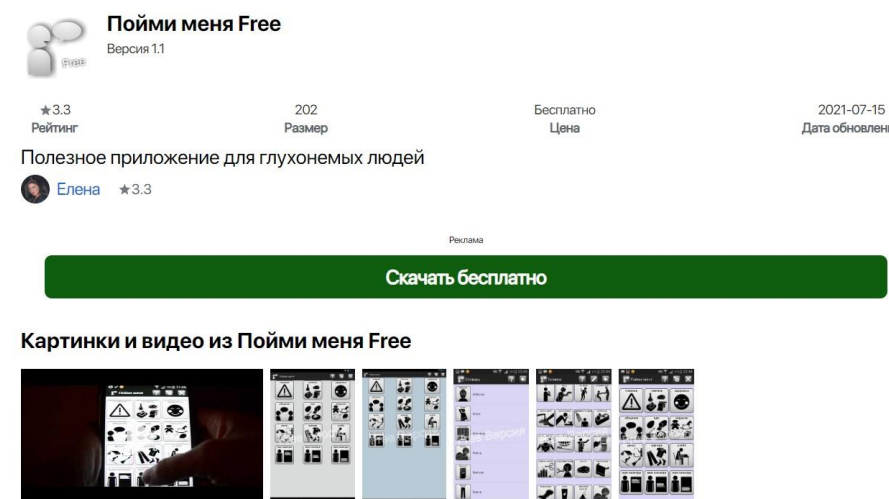


Fig. 4.28. App “Understand me”

5) Digital Inclusion (<http://dimobi.org.ua>) is a digital application for alternative and augmentative communication when verbal communication is not possible (for example, for students with autism and people after stroke, trauma, during treatment), as well as for the development and

restoration of speech, and stimulation of creative thinking. Digital Inclusion is a free app that can be downloaded from the App Gallery, App Store, and Google Play, or you can use it on your laptop. No registration is required (Fig. 4.29).

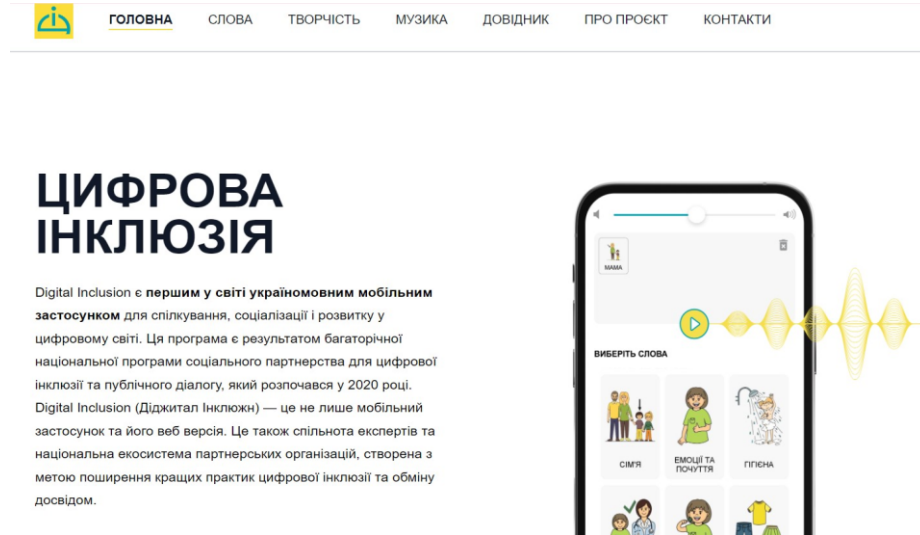


Fig. 4.29. App “Digital Inclusion”

6) «BeWarned» – a mobile application that adapts voice speech to printed text and vice versa, allowing people with hearing impairments to communicate with others (<https://apps.apple.com/ua/app/bewarned-app-for-deaf-and-hard-of-hearing/id990607348?l=ru>). It is built as a universal platform for deaf and hard of hearing people that combines several technical assistants: Sound Monitor, Connect, Emergency Call, and Dance (Fig. 4.30). Sound Monitor is an application that uses neural networks to track potentially dangerous sounds (e.g., screams, car horns, dog barking, sirens, etc.) and warns the user by vibrating and flashing a flash on the smartphone. Connect – helps to communicate with others (converts text to speech and vice versa). Dance – gives deaf and hard of hearing people the opportunity to experience music tracks by converting them into vibrations, light signals and pulsations of the visual equaliser. Emergency Call – helps users call loved ones for help.

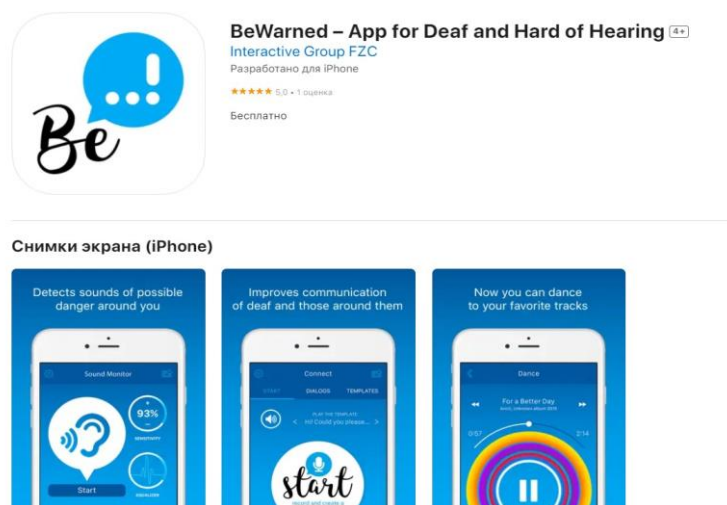


Fig. 4.30. App “BeWarned”

7) «911HELP» – a tool for quick access to emergency assistance for people with hearing, visual and motor impairments (<https://911help.online/uk>). The main functions include the transmission of sound, location, and medical information (Fig. 4.31).



Fig. 4.31. App “911HELP”

8) «Stepping Stone» – is a visual support application designed for people who have difficulty remembering information and sequences of actions. The app allows you to create photo instructions and reminders to complete routine tasks.

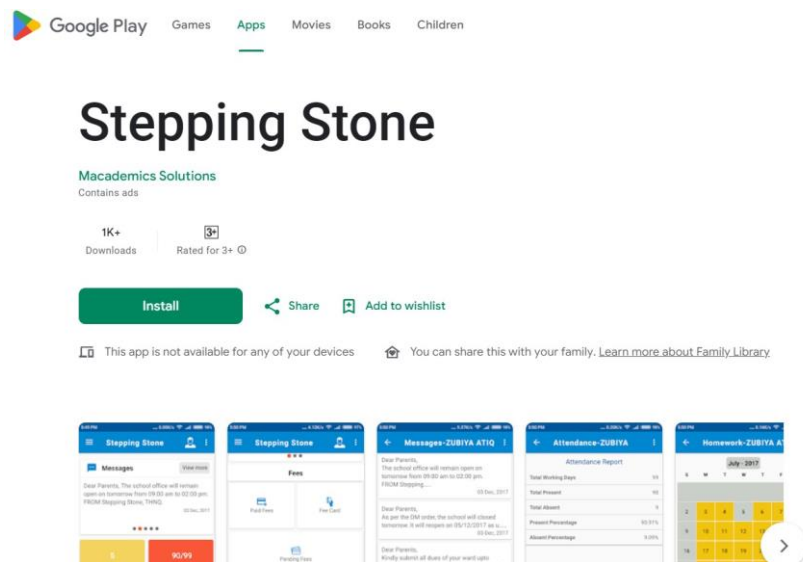


Fig. 4.32. App “Stepping Stone”

9) First Then Visual Schedule – creating visual algorithms. With the help of the app, you can develop illustrated visual diagrams that will help your child complete a task independently (Fig. 4.33). The app is designed primarily for children with autism, Down syndrome, and other mental disabilities, but it will also be useful for teaching children with normal abilities to be independent (<https://getgoally.com/goally-therapy-suite/visual-schedule-app>).

App Store Preview

Open the Mac App Store to buy and download apps.



First Then Visual Schedule 4+

Good Karma Applications, Inc

Designed for iPhone

★★★★★ 3.5 • 11 Ratings

\$9.99

iPhone Screenshots



Fig. 4.33. App “First Then Visual Schedule”

These and many other digitalisation tools help students with various learning difficulties to receive quality educational services and ensure that they feel personally involved in the educational process on an ongoing basis.

Conclusions

In today's digital world, distance education is becoming an indispensable attribute of progress, given the impossibility in many cases of ensuring face-to-face communication between teacher and student (lack of staff, epidemics, wars, lack of funds, etc.). Online services today facilitate continuous learning and participation of everyone in the educational process, despite various learning difficulties and barriers. A variety of digital tools make learning interesting, inclusive and convenient for almost all categories of students.

Today, the use of digital platforms for asynchronous learning allows universities to diversify their activities. Due to the global population ageing and the “silver revolution” (by 2050, the share of the population aged 65+ will be 22% on average, and, for example, in China, up to 30%), providing inclusive courses for older and elderly people, for example, will allow educational institutions not to rely solely on young students in their development strategies in the future³¹.

The involvement of the NEET (Not in Employment, Education or Training) generation, which includes young people aged 16-29 who are not studying, working or acquiring professional skills (other names for this category of people are often used, such as hikikomori, Ni-Ni, and the waithood generation), is quite effective in the context of the sustainability of the AFID project. Representatives of this group of people are cut off from education and the labour market, which often leads to problems with employment and becoming full-fledged members of society in the future³². In different countries, the share of NEETs ranges from 4-6% (Netherlands, Sweden) to 20% (Romania, Italy) of the population³³.

Risk factors for becoming NEET include³⁴:

- 1) education (young people with a low level of education are 3 times more likely to become NEET);
- 2) immigration (young people with an immigrant background are 70% more likely to be NEET than resident citizens);
- 3) disability (young people with a disability are 40% more likely to become NEET than healthy young people);
- 4) unemployment (having unemployed parents in the family increases the chances of becoming NEET by 17%);
- 5) divorce (youth who have experienced a parental divorce have 30% higher chances of becoming NEET);
- 6) place of residence (living in remote areas increases the probability of becoming NEET by 1,5 times).

Low levels of education have the most negative impact on the future of the younger generation, and the AFID project aims to promote inclusive education, equality, justice, non-discrimination and civic values; improve teaching and assessment; and ensure the quality of education, management,

³¹ Čerešňová, Z., Bucchianico, G.D., Hanousková, M., Kacej, M., Končerková, D., Kubica, A., Peňáz, P., Rollová, L. (2018). Inclusive Higher Education. Prague. 240 p.; Daniela, L. (2022). Inclusive Digital Education. Educational Communications and Technology: Issues and Innovations. Springer. 313 p. <https://doi.org/10.1007/978-3-031-14775-3>

³² Кириленко, В.І., Чалюк, Ю.О. (2022). NEET-молодь у системі соціально-економічних відносин. Східна Європа: економіка, бізнес та управління, 2(35), 148-158. http://easterneurope-ebm.in.ua/journal/35_2022/24.pdf

³³ Young people neither in employment nor in education and training by sex (NEET), 2022. https://ec.europa.eu/eurostat/databrowser/view/sdg_08_20/default/bar?lang=en

³⁴ Against the odds (2010). Re-engaging young people in education, employment or training. Local government. 70 p.; Rahmani, H., Groot, W. (2023). Risk Factors of Being a Youth Not in Education, Employment or Training (NEET): A Scoping Review. International Journal of Educational Research, 120, 102198. <https://doi.org/10.1016/j.ijer.2023.102198>



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digital and entrepreneurial skills of students and teachers at various universities. To achieve these goals, the AFID project will provide an inclusive digital environment accessible to different types of users. Online courses that meet the needs of inclusiveness will be available on a flexible schedule (asynchronous format), bilingual, subtitled, equipped with instant messaging (quality feedback), will be close to the needs of students with special educational needs, and will allow users to choose the most convenient way and pace of learning. The proposed set of training materials allows you to master the basic methods of creating inclusive courses for different types of students in both synchronous and asynchronous learning modes, with an emphasis on the latter.

Annexes

Annex A

Principles and functions of inclusive education

Principles	Functions
<p>1. Each person has unique characteristics, interests, values, abilities and educational needs.</p> <p>2. All students should be taught together whenever possible, regardless of any difficulties or differences that may exist between them.</p> <p>3. Educational institutions shall recognise and accommodate the diverse needs of their students by agreeing on different types and paces of learning.</p> <p>4. Educational institutions should provide and organise quality education for all by developing appropriate curricula and teaching strategies.</p> <p>5. Students should receive any additional assistance they may need in the educational process.</p> <p>6. Inclusive education is the most effective means of guaranteeing solidarity, participation, mutual assistance, understanding between students.</p>	<p>1. Legal:</p> <ul style="list-style-type: none"> - ensuring the right of students with special educational needs to receive education in regular educational institutions at the place of residence; - preventing and combating exclusion in education; - identification and removal of barriers to the realisation of the right of students with special educational needs to education on terms of equality and accessibility; <p>2. Educational:</p> <ul style="list-style-type: none"> - acquisition by persons with special educational needs of the system of knowledge, skills and abilities necessary for the development of potential and further successful integration into society; - formation of a positive and tolerant attitude of society towards people with special educational needs as equals; - fostering a sense of respect and self-esteem among people with special educational needs, and an awareness that they are full members of society; <p>3. Economic:</p> <ul style="list-style-type: none"> - preparation of people with special educational needs for employment, development and use of their potential in the labour market; - reducing the number of people on state social welfare; <p>4. Social:</p> <ul style="list-style-type: none"> - assimilation by students with special educational needs of a wide range of values, social roles and expectations on the basis of which people's daily lives are formed, as well as the values promoted by the educational institution; - formation of a human personality based on the acquisition by persons with special educational needs of knowledge, skills, values of cultural heritage accumulated by society; - inclusion of students with special educational needs in the socio-cultural space of the group / class, school, university, community, state.

Source: compiled based on ^{35, 36, 37}

³⁵ Порошенко, М.А. (2019). Інклюзивна освіта: Навчальний посібник. Київ: Агентство «Україна». 300 с.

³⁶ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

³⁷ Саламанська декларація про принципи, політику та практичну діяльність у галузі освіти осіб з особливими освітніми потребами та Рамки Дій щодо освіти осіб з особливими освітніми потребами №995-001-94 від 10.06.1994 р. https://zakon.rada.gov.ua/laws/show/995_001-94#n12

Annex B

Linking different target groups to types of inclusion

Target groups	Inclusion						
	Physical-related	Verbal-related	Emotional-related	Economical-related	Territorial-related	Time-related	Gender-related
1. Students with disabilities / temporary or permanent illnesses	Dark	Dark	Dark	Dark	Light	Light	Light
2. Talented students	Light	Light	Dark	Dark	Light	Light	Light
3. Refugees / migrants / IDPs	Light	Dark	Dark	Dark	Dark	Light	Light
4. International students	Light	Dark	Light	Light	Light	Dark	Light
5. Members of religious / ethnic minorities	Light	Dark	Light	Light	Light	Light	Light
6. Homeless / orphans	Light	Light	Dark	Dark	Light	Light	Light
7. Students from the war zone, other countries, remote areas	Light	Light	Dark	Dark	Dark	Dark	Light
8. Children of military personnel / war veterans	Light	Light	Dark	Dark	Light	Light	Dark
9. Students of senior/retirement age	Light	Light	Light	Dark	Light	Light	Light
10. Low-income / unemployed	Light	Light	Dark	Dark	Light	Light	Light
11. Employees / students enrolled in several programmes at the same time	Light	Light	Light	Light	Light	Dark	Light
12. Pregnant and students on maternity leave	Dark	Light	Dark	Light	Light	Dark	Dark
13. Other types	Light	Light	Light	Light	Light	Light	Light

Source: own research

Annex C

Inclusive learning tools for people with visual and hearing impairments

Learning tools for visually impaired people	Learning tools for people with hearing impairments
Sullivan+ – an application to increase the accessibility of information perception for visually impaired and blind users.	Kapwing subtitle maker – an application that allows you to add subtitles.
SM Music Reader – accessible reading of musical texts for the blind.	Wondershare Filmora – video editor for working with different videos, subtitling, etc.
Max Reader 2018 – a library designed specifically for people with visual impairments.	Microsoft Translator – a resource for live translation and subtitling.
PLEXTALK Recording Software – the programme allows a blind person to create an audio recording independently.	YouTube – an app that allows you to watch videos with subtitles in different languages.
RHVoice – a Ukrainian speech synthesiser that allows blind users to work with Ukrainian-language interfaces and text.	Jubler – a tool for editing text subtitles.
Розмовлялька – a programme for voicing Ukrainian-language texts (full support for the Ukrainian language, the ability to voice texts in several voices with high quality).	SubtitleCreator – a subtitle editor that allows you to change the colour of existing subtitles.
NonVisual Desktop Access (NVDA) – a language access programme that allows blind and visually impaired people to use a computer without the additional cost of purchasing special software.	SubMagic – a tool for creating videos with subtitles (free conversion, editing and translation).

Source: compiled based on ^{38, 39, 40, 41, 42}

³⁸ Інклузивне навчання. http://osvita-koz.at.ua/index/inkluzivne_navchannja/0-56

³⁹ Мобільні застосунки як інструмент допомоги людям з інвалідністю. <https://ck-oda.gov.ua/novyny-cherkaskoyi-oblasti/mobilni-zastosunki-yak-instrument-dopomogi-lyudyam-z-invalidnistyu>

⁴⁰ Інтернет-ресурси для зручної комунікації з учнями в інклюзивному процесі, 2018. <https://naurok.com.ua/post/internet-resursi-dlya-zruchno-komunikaci-z-uchnyami-v-inkluzivnomu-klasi>

⁴¹ Квітка, Н.О. (2022). Сучасний інструментарій дистанційного навчання дітей з особливими освітніми потребами. Освіта осіб з особливими потребами: виклики воєнного часу: Матеріали VIII Міжнародного конгресу зі спеціальної педагогіки та психології (19-20 жовтня 2022 р.). Київ, 156-160. <https://ispukr.org.ua/?p=9597>

⁴² Литовченко, С. (2022). Он-лайн навчання учнів з порушеннями слуху: рекомендації шкільним командам супроводу. <https://ispukr.org.ua/?p=5766>

Annex D

Classification of digital learning and teaching tools

Group of tools	Characteristics
1. Tools for formative and summative assessment of learning outcomes	<ul style="list-style-type: none"> • Kahoot (https://kahoot.it) • Plickers (https://get.plickers.com) • Triventy (http://www.triventy.com) • Mentimeter (https://www.mentimeter.com) • Wordwall (https://wordwall.net) • Socrative (https://www.socrative.com) • GoogleForm (https://www.google.com/forms) • Flipgrid (www.info.flipgrid.com) • Wooclap (www.wooclap.com) • Notion (www.notion.se) • Screencastify (www.screencastify.com) • МайстерТест (https://master-test.net) • LearningApps (https://learningapps.org) • Online Test Pad (https://onlinetestpad.com) • ClassMarker (https://www.classmarker.com/online-testing/faq) • Classroom (https://classroom.google.com/u/0/h) • Quizizz (https://quizizz.com) • Socrative (https://www.socrative.com)
2. Tools for online collaboration	<ul style="list-style-type: none"> • Google Docs (https://www.google.com/intl/uk_ua/docs/about) • Wiki (https://www.wikipedia.org) • Quip (https://quip.com) • Office Online (https://www.office.com)
3. Tools for group communication	<ul style="list-style-type: none"> • Yammer (https://www.yammer.com) • Skype (https://www.skype.com/uk) • Zoom (https://zoom.us) • Appear.in (https://appear.in) • Flowdock (https://www.flowdock.com) • GoToMeeting (https://www.gotomeeting.com) • WebEx (https://www.webex.com) • Padlet (https://padlet.com)
4. Tools for creating presentations and video tutorials	<ul style="list-style-type: none"> • Canva (www.canva.com) • Google Jamboard (www.jamboard.google.com) • Miro (www.miro.com) • CamStudio (https://camstudio.org) • Jing (https://www.techsmith.com/jing-tool.html) • Webinaria (https://www.webinaria.com) • Wink (https://www.debugmode.com/wink.html) • UltraVNC Screen Recorder (https://uvnc.com/screenrecorder) • BB FlashBack Express (https://www.flashbackrecorder.com/ru/express) • Krut (https://krut.sourceforge.net) • InVideo (https://ai.invideo.io)

Source: compiled based on ^{43, 44, 45, 46, 47, 48}

⁴³ Research Compilation Report. Digital practices for inclusive programs. <https://inclusivedigitalpractices.eu>;

⁴⁴ Digital Practices for Inclusive Programs. Digital Resources Toolbox. <https://inclusivedigitalpractices.eu>

⁴⁵ Будник, О., Кондор, О., Дяків, І. (2020). Цифрові технології в інклюзивній освіті: реалії, проблеми та перспективи. Вісник Черкаського національного університету імені Богдана Хмельницького, 3, 39-45

⁴⁶ Клімич, Н. (2020). 7 сервісів для створення навчальних тестів та завдань онлайн. <https://buki.com.ua/news/7-servisiv-dlya-stvorenniya-navchalnykh-testiv-ta-zavdan-onlayn/#Quizizz>

⁴⁷ Соціальна інклюзія та інклюзивна освіта у вищій школі: Навчальний посібник / За ред. Флагерті М., Школяр М. Львів: Новий світ – 2000, 2022. 246 с.

⁴⁸ Digital Practices Research. Insights into digital competencies regarding migrants with special needs in Denmark, Germany, Greece, Italy & Sweden. <https://inclusivedigitalpractices.eu>

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