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MODERN TECHNOLOGIES IN EDUCATION

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Methodological Recommendations

Recommended by the Educational and Methodological Council of the NUOS

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The methodological recommendations describe contemporary technologies in the context of the modernisation of higher education; the advantages of using information and communication technologies in teaching are identified; the specific features of project-based activities and the incorporation of web quests into lessons are outlined; the nature of distance learning as a targeted process of interactive (professional) engagement between lecturers and students is substantiated; various types of media content are analysed: infographics, mind mapping and internet memes, which are designed to accompany the presentation of theoretical material in educational components; the specific features of assessing the competence level of learners (test-based assessment) are investigated, and the advantages of gamification in the educational process are demonstrated; attention has been drawn to the observance of academic culture within the educational institution.

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PREFACE

The strategic task of higher education institutions, in the context of modernisation and a focus on integration into European and global educational spaces, is to adopt a qualitatively new approach to the training of students, one that requires adaptation to the changes of the society, creatively multiplying them, harmoniously combining the best Ukrainian values and traditions, and incorporating advanced international practices.

The specific features of modern technologies in the context of higher education modernisation – such as the introduction of contemporary methods, tools and approaches that shift the focus from the teacher to the learner, enhancing the effectiveness of learning through interactivity, personalisation and active engagement – are described in detail in the methodological recommendations. The authors explore the benefits of using information and communication technologies, project-based learning and web quests.

Particular attention is paid to the organisation of distance learning, its advantages and types; the types of media content designed to accompany the presentation of theoretical material in educational components are analysed, and the specifics of assessing learners' competence levels (test-based assessment) are clarified; the advantages of gamification in the educational process are demonstrated.

The authors of the methodological recommendations analysed the concept of 'academic culture', its content and subject matter, social purpose, structure, and criteria for determining academic integrity; they clarified the legal framework of academic integrity; and characterised the concept of 'plagiarism' and the types and methods of plagiarism.

The methodological recommendations have been developed in accordance with the requirements for the creation of distance learning programmes. The theoretical material is accompanied by diagrams, tables and illustrations. This structure facilitates the effective implementation of blended learning, which has become a central feature of the educational process.

Topic 1

MODERN TECHNOLOGIES IN THE CONTEXT OF HIGHER EDUCATION MODERNISATION: POTENTIAL AND TRENDS

- ☑ Modern technologies in the context of higher education modernisation.
- ☑ Information and communication technologies (ICT).
- ☑ Online platforms for accessing learning materials and conducting classes.
- ☑ Interactive technologies.
- ☑ Project-based learning and web quests.

Theoretical studies

Innovative educational technologies involve the implementation of modern methods, tools and approaches that shift the focus from the teacher to the learner, enhancing the effectiveness of learning through interactivity, personalisation and active engagement. They cover digitalisation, blended learning and STEM education.

Researchers emphasise the creation of a unified educational information environment designed for learning using innovative technologies, that can engage not only students but also lecturers. The advantages of creating such an environment include: the development of a flexible system for acquiring knowledge through the implementation of modern technologies and methodologies, which will enable individual learning pathways; the creation of free access to educational resources for learners regardless of time and location; the opportunity to communicate with teachers and

lecturers to exchange innovative pedagogical ideas; the creation of a system for monitoring the quality of education; the transparency of the educational process; and the creation of a foundation for the development of a market for educational services, which stimulates the development of the country.

Information and communication technologies simplify citizens' access to information and data, enabling swift and effective measures to be taken to improve learning, professional and personal development. ICT competence is a necessity for both lecturers and learners in today's rapidly changing social conditions and needs, a requirement placed on higher education institutions in Ukraine as well as globally, their continuous professional growth and development in the ICT sphere, active participation in educational communities and projects, and the effective integration of resources from international programmes and Ukrainian experience.

ICTs demonstrate effectiveness and productivity through the use of a wide range of multimedia tools, the intensive accumulation of diverse information, flexibility, and effective cooperation between lecturers and students.

The use of technical resources, services and the internet is aimed at improving quality of life, as reflected in the transition from 21st-century information technologies to *smart technologies,* which have become effective in education at a time when our lives are increasingly filled with a variety of smart devices (smartphones, smart homes, smart cars, smartboards (interactive electronic whiteboards, etc.)).

The acronym SMART carries significant meaning: in addition to its literal translation from English, it can be interpreted as Self-directed, Motivated, Adaptive, Resource-enriched, Technology embedded – that is, learning that is self-directed, motivated, adaptive, enriched with resources, and embedded with technology.

Trends in SMART education: a decisive role of distance learning; personalisation of the educational process; gamification as the integration of gaming technologies; the widespread use of

interactive textbooks supported by multimedia technologies; learning through video games, etc.

An interactive whiteboard (SMART Board) enables the lecturer to supplement the lecture and practical course of a subject with video materials (excerpts from TV programmes, films, cartoons); audio recordings (tape recordings); multimedia materials, statistical visuals (diagrams, tables, elements of e-textbooks), etc.

Network-based resources for implementing distance learning:

1. Platforms for conferences using network-based communication.
2. Tools for interacting with learners.
3. Resources for creating texts, assignments and information resources.

Table 1 – **Network-Based Resources for the Organisation of distance Learning**

I. PLATFORMS FOR CONFERENCES USING ALL-NETWORK COMMUNICATION	
zoom	A space for collective work, where individual users and groups can gather and solve educational problems. A meeting can be organized by any of the conference participants, delegating the right to run it to other participants; all those who have been given a call (or identifier) to the conference. You can create a new conference every time, or use a permanent one
Hangouts	A platform for quick messaging and video conferencing (developed by Google). The application enables communication in groups by providing webinars, classes and group communication. During a video conference, participants have the opportunity to display a computer screen by sharing an open window of the application. The advantages of the platform are the following: simple design, preliminary scheduling of meetings; synchronization of conversations; usage as a phone call. The disadvantages of this platform are accessibility from G-Suite; functioning exclusively in a browser; only statuses are available online or offline; no feedback on delivered information

Continuation of Table 1

Office Comm TAGLINE COMPANY	A program built on speed, performance, flexibility and intelligence. The multi-tenant function and multiple accounts (interaction in several accounts is allowed) make it possible to work within a certain team, allowing you to quickly receive notifications in a real time. You can easily join a meeting using the meetings with cross-cloud authentication function in any Microsoft cloud. The platform allows you to find and use information that is hidden in documents, presentations, emails, invitations, and contacts
webex by cisco	A platform designed for meetings, opening up great opportunities for continuous real-time collaboration. There are several versions of this platform: the classic version offers all possible multimedia functions (phone calls, adding people to a call, etc.) and the new (next generation) version, which represents updated functions (global contacts with people around the world; creation of virtual agents; removal of noise and creating a communication channel between operators and customers; conducting digital surveys)
II. TOOLS FOR INTERACTING WITH LEARNERS	
ClassDojo	A platform with more than 50 million users. The proposed communication system helps to establish exchange of messages between teachers, students and their parents anywhere and anytime; to support socio-emotional learning; and manage students' portfolio. The platform has a Stories feature that allows teachers to showcase photos from their classes in a private feed. Classdojo has a wide range of tools for teachers (attendance sheet, diary, timer, etc.)
Google Classroom	Is a free interactive platform designed for educational institutions to upload and distribute tasks; communication with students in 'virtual classrooms'. The platform allows you to create a course; enroll students to it; share materials; check assignments, evaluate them and monitor progress

Continuation of Table 1

Google Docs	Is a free platform that allows you to create and edit documents in a real time; exchange comments; work with several students at the same time; formatting documents (selecting and changing colours, font, decoration; create tables, diagrams, etc;); upload files to the server and download them in the required formats
padlet	An interactive whiteboard that helps you connect text, images, video, audio and allows you to organize 'brainstorming' and post the necessary information; to perform practical tasks together; to create and implement projects. Padlet is easy to use: it summarizes all the material in a virtual space
III. RESOURCES FOR CREATING TEXTS, ASSIGNMENTS, INFORMATION RESOURCES	
Classtime	A web-based platform that enables the teacher to assess the students' knowledge and present the progress of both of each individual student and the class as a whole. The advantages of this platform are assessment of knowledge; easy-to-use interface; full integration with Google Classroom is possible
K! Kahoot!	A learning platform that allows you to conduct classes in an interactive format; to check the level of students' achievement by testing them. The features of the platform are the following: to involve up to 50 participants in the process of testing; independent creation of questions; automatic movement of answers in the question; use of images; managing the time for completing tasks; determining the rating for correct answers; building the group's progress
Learning Apps.org	An online service that allows you to create interactive exercises. With its help, teachers can develop and store interactive tasks in various subjects, and students can complete them in a game-like manner. The service is available in many languages, including Ukrainian

End of Table 1

	An online resource is designed to perform certain functions in the most efficient and transparent way. These functions are the following: homework, online attendance; class management; reporting on the work done. Study-smile is characterized by an easy-to-use interface and interesting features. The service provides a systematic presentation of an educational material; its comprehensiveness; teacher's support
На Урок	An educational resource for teachers, which includes a library with author's materials and useful articles. The platform is difficult to register and to create tests; a large number of different functions; there are five types of tests and only two types of questions
МІЙКЛАС	The free online platform MyClass offers for the teacher to prepare tasks for distance learning; it is designed to motivate students to learn by competing with their classmates. The resource is approved by the Ministry of Education and Science of Ukraine as an innovative platform for the New Ukrainian School. The interface is in Ukrainian. The main functions of the service are monitoring and checking the quality of the homework done by the students and building an individual approach to each student. The advantages of this platform are the following: about 2 million tasks; methodological recommendations for teachers; variants of tasks; task options; guarantee of student independence during the completion of tasks; automatic checking of the level of completion of tasks; the ability of each teacher to create their own programmes independently

Interactive learning is a specific form of cognitive activity in which the participants (the student and the lecturer) are equal, equivalent partners in the learning process; they understand what they are doing and reflect on what they know, are able to do, and are actually doing. Interactive engagement excludes both the dominance of one participant in the educational process and the dominance of one opinion over another. Taking into account

the possibilities of interactive learning and its implementation in the educational process has significant advantages: facilitating the process of assimilating new material and developing the ability to analyse it; stimulating interest in non-standard organisation of educational activities; stimulating intellectual and creative work and improving the retention of information; developing the ability to communicate within a group; establishing communicative readiness for work in a student group and developing speech and communication skills; consolidating the ability to formulate one's own opinion and express it correctly; agreeing on and accepting the rules of conduct for joint activities; fostering a high sense of responsibility for the outcome of group work.

Interactive learning groups: cooperative learning; group-based learning; situational modelling; discussion-based activities; and others.

Internet projects are designed to enhance students' skills by providing them with a substantial amount of information. There are two types of projects: www-projects and email-based projects. Their planning, implementation and outcomes differ significantly, as www-projects focus on developing the ability to find information online and present the results of one's own research, whilst email-based projects improve written communication skills.

Project development technology helps to achieve a range of educational objectives: to recognise the need for knowledge; to teach students to acquire this knowledge independently and apply it to solve new cognitive and practical tasks; to foster the development of students' communication skills; and to instil the ability to use research methods.

Web-quest is a set of guidelines and a framework that are structured and implemented using links to online resources across the internet, with the aim of analysing online material in depth.

Types of Web-quest:

– by format: computer games, QR quests, media quests, combined quests, etc.;

- by mode: real, virtual and combined modes;
- by duration: short-term and long-term;
- by form of work: group and individual;
- by subject content: single-subject and cross-curricular;
- by plot structure: linear, non-linear, circular;
- by information environment: traditional and virtual environments;
- by technical platform: virtual diaries, journals, websites, forums, Google Groups, social networks;
- by dominant activity: research, information, creative and role-playing quests.

B. Dodge, the developer of webquest technology, also emphasises a classification based on the type of activity, which includes:

- retelling – demonstrating an understanding of a topic by presenting material from various sources in a new format;
- planning and design – developing a plan or project based on specific conditions;
- self-awareness – any aspects of personal development;
- compilation – transforming the format of information obtained from various sources;
- creative task – creative work within a specific genre;
- analytical task – searching for and organising information;
- reaching consensus – arriving at a solution to a pressing issue;
- evaluation – justifying a particular point of view;
- journalistic investigation – an objective presentation of information;
- persuasion – the ability to sway an opponent or neutral parties towards one's own point of view;
- scientific research – the study of various phenomena, discoveries and facts based on unique online sources.

Stages:

1. Introduction, which involves defining the topic, assessing the project's significance and developing its outline.
2. Main task – a series of steps aimed at solving the problem; identifying key issues and defining and independently solving practical tasks.
3. Compiling a list of information resources.
4. Process – a step-by-step description of the tasks.
5. Assessment – a scale for evaluating the quality of the work completed.
6. Conclusion – summary of the results of the work.

Web-based quests may also have other features: they can be conducted in groups; motivational elements can be integrated around a core structure; and web-based quests can be designed to cover either a single subject or cover several courses.

Positive features of web quests: a selection of tasks relating to a single topic, which helps to establish logical interdisciplinary connections and transfers the student from one context to another; enables the 'transfer' of acquired knowledge into the real world (feedback), by demonstrating and analysing teachers' and lecturers' lectures, politicians' speeches, etc.; promotes the development of personal thinking patterns and the independent use of effective learning strategies.

Topic 2

DISTANCE LEARNING AS A TARGETED PROCESS OF INTERACTIVE (PROFESSIONAL) INTERACTION BETWEEN LECTURERS AND STUDENTS

- ☑ Forms of learning in higher education institutions (traditional forms of learning; non-formal education; informal education; forms of learning incorporating elements of distance learning; blended learning; online learning).
- ☑ Blended learning as a combination of learning technologies using a flexible approach to education. Combinations of blended learning. Models of blended learning.
- ☑ Distance learning as a purposeful process of interactive (business-oriented), asynchronous and synchronous interaction between lecturers and students:

  Characteristics of distance learning · Types of distance learning · Challenges of implementing distance learning in the higher education system · Models of distance learning · Modes of implementing distance learning models · Tools of distance learning.

Theoretical studies

Form of learning is a didactic category that refers to the external aspects of the organisation of the educational process, relating to the number of learners, the time and place of learning, and the manner in which it is conducted.

Higher education is represented by: a) traditional forms of teaching, b) forms of teaching that include elements of distance learning (hereinafter DL), c) blended learning, d) pure distance learning (online learning).

Traditional forms of learning: lectures, seminars, practical sessions, laboratory work, and student's independent work.

Non-formal education is education that is generally undertaken through educational programmes and does not lead to the award of state-recognised educational qualifications by level of education, but may result in the award of professional qualifications and/or partial educational qualifications. It serves as a supplement and/or alternative to formal education in a person's lifelong learning. Platforms for obtaining non-formal education: *Prometheus, Vseosvita, Coursera, Education Era, Diya. Digital Education*.

Informal education (self-education) involves an individual's self-directed acquisition of specific skills, particularly through everyday activities related to professional, social or other activities, family life or leisure; it is a lifelong process of learning within a cultural and educational environment.

Blended learning – a combination of learning technologies through a flexible approach to education, involving the completion of tasks online using methods that can improve student's outcomes and/or save teaching time; a targeted process of acquiring knowledge, skills and competences, carried out by various types of educational institutions within the framework of formal education, part of which is carried out remotely using information and communication technologies and technical teaching aids, which are used to store and deliver learning materials, conduct assessments, and organise interaction between participants in the educational process (consultations, discussions), and during which the pupil (student) exercises self-control over the time, place, and pace of learning.

Blended learning models: the rotational model – alternating between face-to-face and online learning; the flexible model, typical for educational institutions where this approach predominates, providing guidance to learners both in person and via online

resources; the person-centred model is based on individual timetables supplemented by external online resources; the enriched virtual environment model, implemented through distance learning and various online programmes.

Distance learning is an educational process in which a variety of information technologies (computer programmes, internet technologies, etc.) are actively used; it facilitates students' independent research activities using materials from electronic libraries, databases, and so on; independent projects and methods are created by participants in the educational process; there is constant communication between the lecturer and the student (or group of students); differentiation in teaching is taken into account (the development, implementation and assessment of tasks at different levels, and the recording of results in the group's electronic register).

Objectives of distance learning: enhancing the student's role in the learning process; increasing the volume of accessible information; enabling virtual communication with lecturers and specialists; solving problem-based tasks through the implementation of interactive forms of learning and multimedia components; providing comfortable learning conditions; involving a large number of project participants living in different cities and countries.

Characteristics of distance learning:

- *flexibility* allows students to study at a time that suits them, in a convenient location and at their own pace;
- *modularity* – the creation of a personalised individual or group study plan from independent course modules;
- *accounting for parallelism* ensures that learning can be combined with professional activities;
- distance learning guarantees *full access to information* as simultaneous access to multiple educational resources by a large number of users;

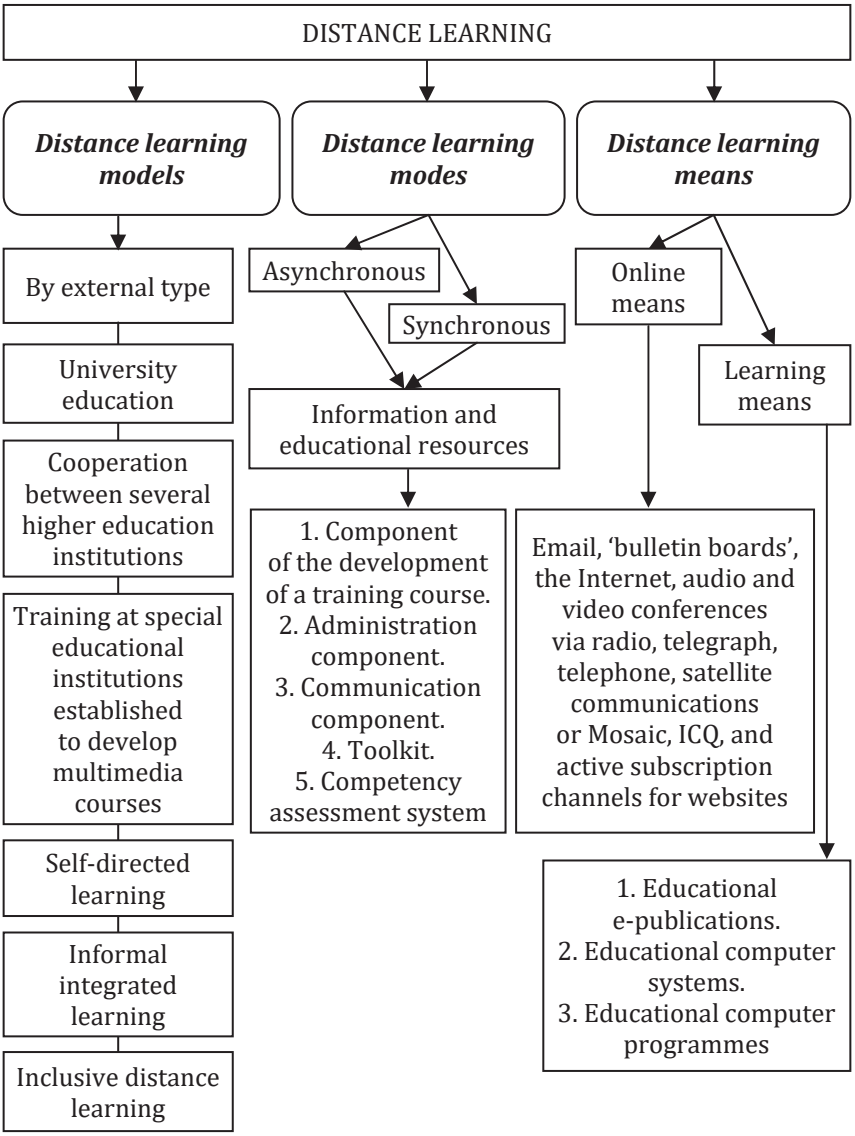

Figure 1 – Distance learning system

- *cost-effectiveness* – the efficient use of technical and transport resources, teaching spaces, the concentrated and standardised presentation of educational information, and multi-access to it, which reduces the costs of training specialists;
- *mass participation combined with a personalised approach*, the individual nature of information acquisition, required by specific students at a pace suited to their abilities;
- *cognitive focus* enables the development of greater perseverance in acquiring knowledge, organisation, the ability to work independently, and skills in using computers and telecommunications;
- *diagnostic focus* involves assessing the level of development of users' abilities and professional qualities, and constructing a corresponding socio-psychological profile with the aim of selecting effective teaching methods and resources;
- *motivation* fosters an interest in relevant knowledge with a view to its subsequent practical application to support professional career development;
- *humanism* focuses teaching on the individual, taking into account their personal characteristics and creating favourable conditions for the acquisition of knowledge and the development of creative abilities;
- *social equality* provides equal opportunities for everyone to receive an education, regardless of place of residence, health status, social status or financial means;
- *internationality* involves the export and import of global achievements in the education services market.

Types of distance learning:

1. External study – focuses on the examination requirements of higher education institutions, intended for students who are unable to attend the institution for various reasons.
2. University education (based at a single university) – for students studying by correspondence or via distance learning.

3. Education based on cooperation between several higher education institutions, enabling the development of higher-quality teaching materials for distance learning courses.
4. Education in specialised educational institutions established to develop multimedia courses for part-time and distance learning.
5. Autonomous learning systems are implemented entirely through television and radio programmes, as well as supplementary printed materials.
6. Informal integrated learning based on multimedia programmes, i.e. self-study programmes.

Distance learning models:

– *asynchronous learning*, where students located away from the educational institution form groups for a single course and follow an individual study plan using teaching materials developed by the higher education institution. Such communication takes place via email; through file sharing, forums, and wikis;
– *synchronous learning* ('collaborative work'), when higher education institutions are geographically separated, that provides for the conduct of classes, and a group of students study simultaneously (currently, this may be a virtual study group; students do not necessarily have to be in the same classroom). In this case, interaction between lecturers and students takes place in real time.

Distance learning resources are broadly divided into online resources and learning materials.

The former includes: email, 'bulletin boards' (BBS), the Internet, audio and video conferences with one-way or two-way communication via radio, telegraph, telephone, satellite communication or Mosaic – a graphical interface to the World Wide Web, ICQ – a system for instant messaging (Internet pager), active subscription channels for websites, etc.

Table 2 – **Online resources of distance learning**

Email	A method of exchanging digital messages between people using computers, mobile phones and the internet, which enables the transmission of messages in the form of plain text as well as in other formats (graphic, audio, video), either in plain or encrypted form. The technology is widely used in education to coordinate and establish feedback between lecturers and students, and to share teaching materials and completed assignments. *Google Gmail, ukr.net, Outlook, Meta.ua, Online.ua, i.ua*
Video conference	The most effective method for organising distance learning, and one of the modern means of communication, which enables classes to be held when the lecturer and students are in different locations and use video technology as the primary channel of communication. *ZOOM, My Own Conference, Google Meet, Jitsi, Big Blue Button, Open Meetings, Microsoft Teams*
Forum	A communication tool within an online learning system that enables participants in an e-learning course to engage in asynchronous discussions. Each forum is dedicated to a specific issue or topic. The forum moderator facilitates the discussion by posing questions, posting messages and sharing new and interesting information. The forum software allows users to attach various files of a certain size. Several forums can be combined into one large.
Blog	A website with a specific structure (pages) containing theoretical and practical information (articles, photos and videos, links to other educational resources, presentations, surveys, assignments, etc.) for lecturers and students. Blogs can be used for both group and individual work with students. *Wordpress.com, Blogger.com., Blog.net.ua, Blox.ua*
Chat	Real-time communication between internet users; a means of instant communication via the internet. Types: text, voice, audio and video chat. The most common form is text chat. *Viber, Telegram*

The second group includes:

- educational e-publications;
- educational computer systems;
- audio and video teaching materials;
- the World Wide Web.

Educational e-publications – automated educational systems containing teaching, methodological and reference materials relating to the educational component, as well as software that enables their comprehensive use for both independent study and assessment of knowledge (teaching and methodological guidelines for organising independent study, carrying out coursework or qualification research, preparing for final assessment, etc.).

Educational computer systems – software tools for use in the educational process, which make it possible to: differentiate the learning process; monitor the individual, diagnosing errors and providing feedback; facilitate self-monitoring and self-correction of learning and cognitive activities; reduce learning time by having the computer perform complex calculations; display visual educational information; model and simulate processes and phenomena, and conduct laboratory work, experiments and investigations in a virtual reality environment; instil decision-making skills, etc.

Computer-based learning programmes use dialogue, with the student's responses determining the programme's algorithm, which is designed to provide specific recommendations, explanations and prompts, acting in the role of a lecturer.

To improve the effectiveness of student support in higher education institutions, the following are recommended for use: electronic textbooks; electronic teaching guides; assessment tests; electronic audiovisual aids; and so on.

E-textbook is a multi-purpose educational software system that ensures the continuity and comprehensiveness of the teaching cycle within the educational process; it provides theoretical material, facilitates practice-based learning activities and assessment of

knowledge levels, as well as information and search activities, simulation modelling with computer visualisation and service functions, subject to interactive feedback; a software and information system comprising personal computer programmes that implement educational activity scenarios and knowledge prepared in a specific manner (structured information and systems of exercises for understanding and consolidation).

Based on the structure of the material, several types of e-textbooks are distinguished:

- textbook;
- hypertext textbook (presented in a 'tree' structure);
- reference-based textbook (presented in the form of a reference guide);
- game-based textbook (presented in the form of a business simulation).

The educational material of e-textbook can be static (unchanging in response to the student's commands) or dynamic (changing in response to software settings), monochrome or multicoloured, with or without audio support.

Topic 3

MEDIA CONTENT: DEFINITION AND TYPES

- ☑ Media content and its types.
- ☑ Information and communication support for educational components.
- ☑ Infographics: benefits of use and methods of creation.
- ☑ Mind mapping in the learning of language and literature subjects.
- ☑ The internet meme as a linguistic and cultural unit of the modern media space.

Theoretical studies

Media education forms part of the educational process; it aims to foster a media culture within society and to prepare individuals to engage safely and effectively with the modern mass media system, covering both traditional (print media, radio, cinema, television) and new media (computer-mediated communication, the Internet, mobile telephony), taking into account the development of information and communication technologies.

One way to improve the presentation and comprehension of educational material is through ***infographics***, a form of visual representation of information, data, facts, statistics and knowledge in the form of an intuitive and concisely designed diagram, chart or illustration. Infographics enable large amounts of information to be organised in an accessible and understandable way.

Table 3 – **Media Education Resources**

Technical tools for improving the teaching process	Technical and electronic equipment and devices used to develop and reproduce digital learning resources
General-purpose software	Microsoft Office applications used for preparing and formatting educational materials: *Microsoft Word, Microsoft PowerPoint, Microsoft Publisher*; image editing software (*Paint, Corel Draw*, etc.); programmes for processing, editing, and playing audio and video: (players (*Adobe Flash Player, AIMP, Winamp, Windows Media Player*, etc.); editors (*Windows Movie Maker, Windows Live Movie Maker,* etc.); converters (*Format Factory, Free Studio,* etc.) and so on
Software for teaching purposes	For creating, saving and playing back presentations; recording, editing and playing back images; software tools for developing digital learning resources, including programmes for creating digital guides and textbooks (*AD Tester, BookEditor, Ebook Edit Pro, ExeBook, Hyper Method, Macromedia Authorware, Macromedia Director, ToolBook, ChmBookCreator, Crossword, SunRuv*) and so on
Software for creating educational web pages, websites and portals	*Microsoft Publisher, Front Page* and so on.
Creolized resources	Photos, comics, advertising leaflets, school newspapers
Network resources	Social media, blogs, websites, forums, webinars, YouTube
Audiovisual resources	Television and radio programmes, films, cartoons

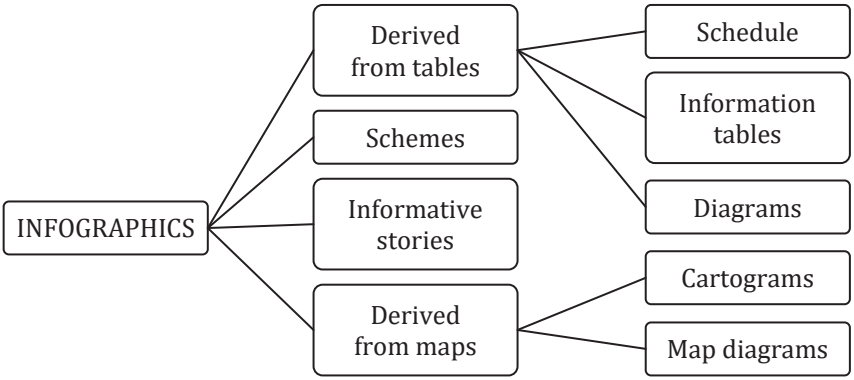

Figure 2 – Types of Infographics

Components of infographics.

- *A table* is a method of organising data by arranging it into rows and columns of the same type. Graphs, information tables and diagrams are derived from tables.
- *An information table* contains a list, details, theoretical material or other data arranged in a specific order of rows and columns.
- *A diagram* is a graphical representation of a mathematical model (bar and line charts; area charts; percentage charts; pie charts; scatter plots).
- *Illustrations* (drawings, maps, photographs, etc.).
- *Cartogram* – a thematic map on which the size of a territorial, most often administrative, unit varies according to the size of the features (background (created using colour or hatching to denote specific territories); dotted (depicted using dots to indicate the location of the territorial phenomena under study)).
- *Scheme* – a simplified representation of the general features of a system, the structure of something, or mutual arrangement and connections of its parts (abstract, concrete and flowcharts).

Table 4 – **Internet Resources For Creating Infographics**

easelly create and share visual ideas online	Is an editor with a limited number of free templates (10 diagrams, 25 photos, and 10 infographic fonts for infographics). The service's interface is simple and easy to use, so it's a good first step in creating an infographic, but it's not useful for users who want to create complex information graphics. Advantages: a set of free templates, the ability to edit, (a paid subscription will expand the possibilities for creating information graphics)
Canva	Is a service for creating high-quality infographics, such as informational stories, charts, tables, diagrams, etc., which can be developed using free templates; it is possible to edit templates, upload photos, remove and add elements. The online resource allows to work in a group in real time, and a premium subscription gives more options when creating infographics. Advantages: user-friendly interface, a large number of free templates and graphics, and the ability to save in video, PDF, and JPG formats
freepik	Is a resource that focuses on design, photography and illustrations suitable for infographics. With Freepik, you can find various elements and templates for information graphics. Advantages: access to over three million elements for infographics
visme	A platform that provides a set of free templates for creating static infographics, has limitations when editing, some elements of the template cannot be deleted, but you can upload your own images, add tables and diagrams. Advantages: convenient tools for infographics, fast interface
Animaker	A tool for creating dynamic infographics. The service uses simplified elements, including animated objects; saves previous versions of video infographics that can be viewed and edited; and allows to download information graphics or use a link. Advantages: the ability to quickly create video infographics

Mind mapping is a method of visual representation of any information, with the help of which you can organize a large amount of material. *A mental map* (mindmapping, associative map, mind map, memory map) is an exceptional technique that allows you to not only organize information, but also better perceive and remember it.

Features of mind maps: concise, clear and consistent presentation of thoughts; use of graphic images, images for further analysis of information; work with three or more branches; options for font sizes, line thickness, scale of graphic elements; use of arrows to emphasize connections between branches of the map; outline of parts of important information with lines.

Internet meme – any witty short information (phrase, image, sound scale, video) of an ironic nature, which reproduces a certain attitude to some events or circumstances and spreads on the Internet.

Levels of Internet memes: *media memes*, which spread rapidly in the media, the Internet, on television, in oral speech; *local memes*, which are structural units of the third, highest level; *memeplexes* – global cultural layers, which, when combined, form a cultural complex that has a certain social significance.

Characteristics: *virality* (rapid spread in the Internet space); *replicability* (reproducibility, the ability of users to reproduce images or information); *emotionality* (evoke and convey certain emotions); *seriality* (creation of series, a series of similar units that are united by content, idea, theme); *mimicry* (stylization for their placement on the Internet); *minimalism of form* (conciseness of the content of the meme to facilitate its understanding and distribution); *polymodality* – (information is transmitted both verbally and visually).

Table 5 – **Apps For Creating Mind Maps**

FreeMind	An app for creating mind maps. *Advantages*: clear control; availability of all tools that necessary to create a map; the ability to download mind maps in a convenient format (PNG, JPEG, XML, HTML, XHTML, etc.); the ability to include links to external sources
Xmind	An online program that allows you to create convenient mind maps, Fishbone diagrams, and organize brainstorming sessions. *Advantages*: creation of various maps and schemes; bright design: background for the entire map or individual parts, several style options, lines and colors, icons; a large number of various tools and functions (setting any font parameters, editing and spell checking, external references, etc.); the ability for several users to work on one mind map at the same time
Draw.io	An online service that allows you to create not only mind maps, but also diagrams and various flowcharts. *Advantages*: the ability to work without registration, but when you first log in to the program, you must select the environment in which future maps will be stored; the application is multifunctional
Imindmap	The program fully complies with the mind mapping technology. *Advantages*: four modes: creating mind maps, brainstorming, recording thoughts and ideas; 2) more than 130 types of styles; 3) tools for performing useful tasks (for example, spell checking, the ability to customize notes and set your own formats, etc.); 4) the ability to add audio files and images; 5) export files in PDF, SVG, 3D images, web pages, Power Point presentations, as well as archiving in ZIP files

Table 6 – **Programs For Creating Memes**

	A photo editing and meme creation tool; has a large number of templates to create your own memes. In addition, MEME Maker has various animation effects, filters and collages
	A program for creating memes using a smartphone or computer; has a universal editor that includes fonts, effects, stickers. Created memes can be shared immediately on social networks
	The program allows you to create your own memes by adding text to ready-made templates; memes are collected in a library and sorted alphabetically, so to develop your own image, just select a template and add text. The interface is in English, but this does not create difficulties during use
	To create memes, you must first download a background image from other sources; there are several options for working with text (for example, the ability to change the text colour, size and font of letters, add any number of lines); you can install it from the official website, the application takes up little space and does not overload the system
	A program that allows you to create visual elements of various kinds. Using the editor, you can easily customize memes without watermarks and font restrictions, using flexible templates. The application allows you to instantly add, choose any text colour, as well as a format in which it is convenient to download the meme to your phone or computer (in JPEG, PNG or PDF format) or publish it on social networks; rotate the image, use any number of inscriptions

Topic 4

QUALITY OF KNOWLEDGE ACQUISITION IN DISTANCE LEARNING

- ☑ Assessment of the student's level of competence.
- ☑ Test control of the quality of students' knowledge.
- ☑ Gamification of the educational process.

Theoretical studies

The quality of knowledge acquired in the process of distance learning is determined by the following indicators: assessment of the student's knowledge of educational components; level of systemic competence; level of competence in optimal resource allocation; level of competence in working with information; assessment of the ability to write, speak, listen; assessment of personal responsibility, sociability; assessment of the ability to work in a team, teach others and negotiate.

The most common means of checking the depth of a student's assimilation of the program material of the discipline is training tests for self-testing or intermediate test tasks.

A test is a task of a standard form, the performance of which must reveal a certain level of knowledge, skills and abilities, in particular the ability to listen, perceive and remember what is heard (listening), read the text, and then reproduce it in oral or written form (speaking and writing). Test control helps to establish the level of knowledge acquisition, the formation of skills and abilities of test participants and evaluate their results according to previously defined criteria.

When developing a set of test tasks, four components are used: a test, a bank of test tasks, testing, and analysis of results.

In the scientific literature, types of test tasks are distinguished by the presence or absence of answer options: *closed-form test tasks* – the test participant chooses the correct answer from a list of possible options; *open-form test tasks* – the test participant independently formulates the answer to the question based on its content.

Types of closed-form test tasks:

- *tasks with the choice of one correct answer* – the task consists of a condition (question), a list of answer options (4–5), one of which is correct, and the rest are presented as plausible incorrect ones (distractors), which can confuse a student who is unsure of his answer;
- *multiple choice tasks* – the task involves the test participant choosing several correct answers from a list of proposed ones. In this type of tests, each answer option must be either absolutely correct or absolutely incorrect in order to avoid ambiguity;
- *matching tas*ks (logical pairs) consist of an instruction-task and four tasks marked with letters (or numbers), for each of which the test participant selects one answer option. Such tasks have 4 bases and 5–6 options for them, 1–2 of which are distractors;
- *sequence reproduction tasks* – the test participant is asked to choose the correct elements from the list and arrange them in a clearly defined sequence.

Types of open-form test tasks:

- *short-answer tasks* – the task requires a concise and precise answer formulated in several sentences;
- *extended-answer tasks* – the student must provide an answer in the form of a written statement (a short work, essay), justifying the proof or refutation of the proposed thesis.

Table 7 – **Online test platforms**

Google Forms	A Google Apps tool that makes it easy to create tests, surveys, quizzes and web-based quests. *Advantages*: a simple and intuitive interface; the ability to analyse responses in real time; test results are automatically saved to Google Drive, recorded in dedicated spreadsheets and are always accessible online. Allows you to create test questions in various formats: short-answer, paragraph (text answer entered via keyboard); with one or more answer options ('checkboxes', 'checkbox grid'), with a choice of answers from a list ('drop-down list'); using multimedia resources (uploading images, YouTube videos). Requires the installation of the Flubaroo plugin and a Google account
Online Test Pad	A free, multi-functional test creation tool. *Advantages*: a wide range of tools for creating test questions that can be completed without an internet connection; automated marking; learners' answers are automatically saved in the 'Test Statistics' section. The platform offers 18 question types: single or multiple correct answers, free-form answers, sequencing and matching, fill-in-the-blanks, sliders, text entry, file upload, sequential elimination, and interactive dictation
QUIZIZZ	An online platform for creating and delivering game-based tests, web quests, quizzes and interactive tasks. *Advantages*: user-friendly platform interface; option to choose between 'Play Live' mode (taking the test synchronously under the lecturer's supervision) and 'Homework' mode (independently in asynchronous mode); instant feedback; automated marking; ability to integrate audio, video and images into tasks. Range of question types: open-ended and closed questions, matching, multiple choice, graphing, etc.
Testmoz	Test generator. *Advantages*: user-friendly interface, test creation without the need to register an account, and the ability to embed videos, audio and images into questions. The service offers the following types of tests: true or false, single-choice, multiple-choice, text entry, and matching

End of Table 7

Classtime	A free online resource designed for assessing knowledge through tests. *Advantages*: a simple and user-friendly interface, instant feedback between the teacher and the learner, automated marking, and the ability to upload media files. Types of test questions: single choice, multiple choice, true/false, text, matching, sequencing, text selection, and fill-in-the-blanks

Table 8 – **Online platforms for organization of monitoring students' achievements**

moodle	The virtual learning environment is designed for organizing and managing learning in the Internet using ICT. It ensures the security of information and its transfer from lecturer to student, carries out the assessment of educational achievements, compatible with standard software. One of the main features is the built-in assessment system, which allows for various types of testing
Google Classroom	A platform available to Google account holders; allows you to create courses, submit assignments, check the level of knowledge acquisition, track the progress of students' achievements, and provide feedback. The service supports integration with Google tools: Google Drive, Google Docs, Google Slides, Google Sheets, Google Forms, Google Sites, Gmail, and Google Calendar.
Bb Blackboard	A platform that allows to manage a virtual learning environment, create electronic training courses and provide remote access to them, monitor the educational process, accumulate and structure the educational base, create tests. Provides the ability to conduct video conferencing and contains other interactive tools for effective communication between the lecturer and students
HUMAN	The platform is used to transition to electronic document management, provide participants in the educational process with 24-hour access to educational materials, their exchange and commenting. The system provides the opportunity to control knowledge through testing, view visualized statistics of student achievements and course attendance

End of Table 8

edmodo	The platform provides the ability to create courses, promotes effective interaction between participants in the educational process through communication and file exchange. Edmodo tools for assessing learning outcomes with an automated grading system: designers of tests, quizzes, educational games

Gamification is the use of game elements and the creation of games in a non-game field.

Components of the gamified process:

– the user (participant in the educational process);
– tasks provided for completion;
– cumulative points – the result of completed tasks;
– game levels that participants must pass;
– ranking of participants according to their achievements during the game (achievement scale, total score, final score, rating);
– badges that are an award for each completed level.

Six steps for the successful implementation of gamification:

1) a specific, measurable, achievable, relevant, time-limited goal of gamification (goal of gamification=SMART); the goal defines specific tasks;
2) behavior thought out for each game participant (what to do?, how to measure it?, how to achieve the goal?, what is the feedback?);
3) clearly defined descriptions of players;
4) development of a gamification system built on the macro level based on the principle of motive – action – feedback and macro level based on the 'player's journey' according to a certain scenario, on which the entire gamification system is based;
5) mechanisms of gamification and providing a sense of satisfaction from the success of playing the game;
6) gamification tools – information and cloud technologies, mobile applications, gadgets, etc.

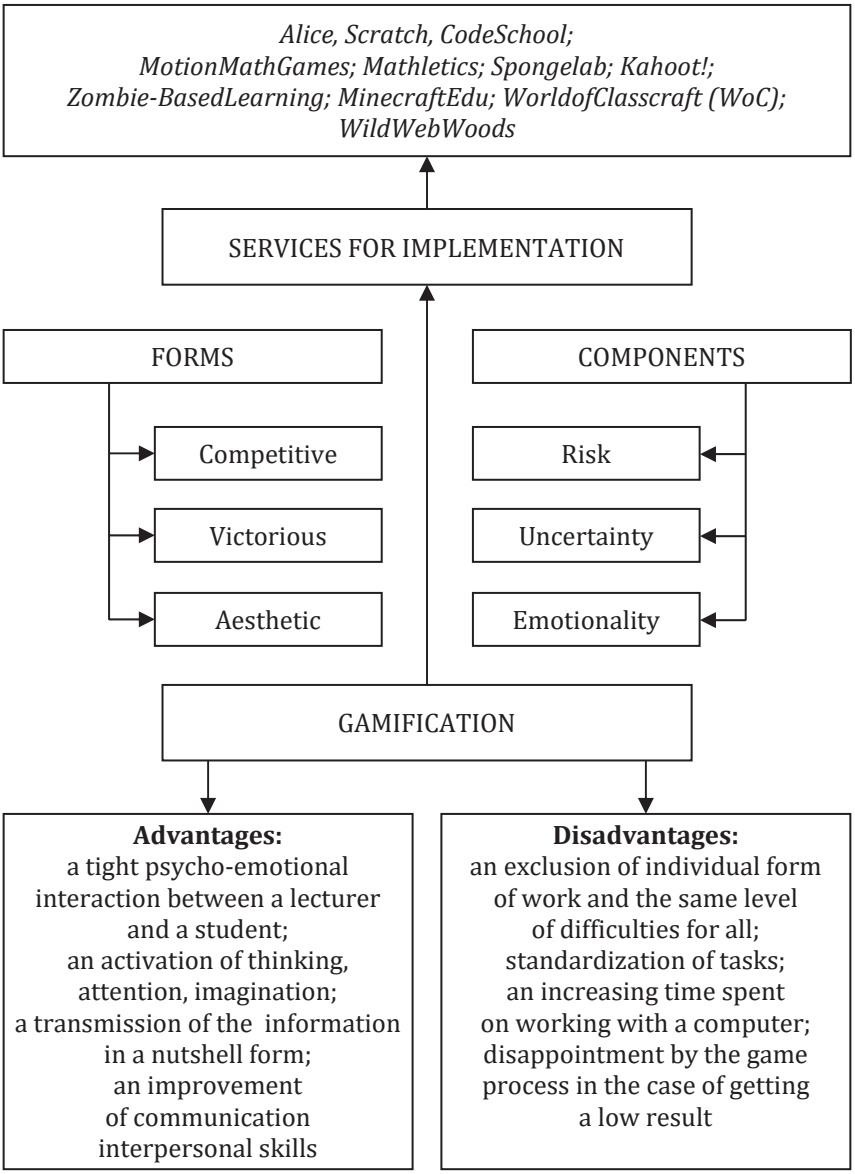

Figure 3 – Gamification

Table 9 – **Services for implementing gaming into the education system**

Alice SCRATCH CODE	Alice (https://www.alice.org/), Scratch (https://scratch.mit.edu/), Studio.code (https://studio.code.org/) – environments for learning the basics of algorithmization and programming in a game form
Code School	CodeSchool (http://codeschool.uzhnu.edu.ua/) – programming training service with elements of gamification
motion MATH	MotionMathGames (https://motionmathgames.com/) – mobile and desktop math games
Mathletics	Mathletics (http://uk.mathletics.com/) – is an educational site for schoolchildren aimed at engaging children in mathematics through games and competitions
SPONGELAB INTERACTIVE®	Spongelab (https://www.spongelab.com/landing/) – a platform for personalized scientific education
Kahoot!	Kahoot! (https://kahoot.com/) – is a free online service for creating interactive educational games
	Zombie-BasedLearning (http://zombiebased.com/) – a service for learning using the theme of zombies and game elements to build a geography course
MINECRAFT	MinecraftEdu (https://www.minecraft.net/) – is an online simulator in which players can create game worlds from blocks, as well as interact with other players

End of Table 9

Classcraft	WorldofClasscraft (WoC) (https://www.classcraft.com/) – a free game platform related to the field of educational design
THROUGH THE WILD WEB WOODS	Wildwebwoods (http://www.wildwebwoods.org/) – is a travel game for the youngest Internet users, which involves the performance of various tasks and quests, in the process of which the rules of safe use of the network are learned and this knowledge is applied in practice

The competitive form involves motivating game participants to solve class tasks (tools – tables, goals, rules); the result of victorious form is the completion of tasks where everyone is a winner (Win-Win mechanism); the aesthetic form is the satisfaction of the participants of the game and receiving an award.

Disadvantages of gamification:

– the exclusion of an individual form of work and the same level of difficulty for all students;
– standardization of tasks, which does not contribute to the development of the abilities of a high school student;
– increase in time spent on working with a computer;
– disappointment with the game process in case of obtaining a low result.

Topic 5

ACADEMIC CULTURE IN AN EDUCATIONAL INSTITUTION

- ☑ Academic culture and ethics in higher education.
- ☑ Academic freedom and responsibility of all participants in the educational process.
- ☑ Legislative field of academic integrity.
- ☑ Academic integrity of a lecturer is the key to student integrity.
- ☑ Plagiarism. Self-plagiarism. Anti-plagiarism programs.
- ☑ Basic rules for using original texts.

Theoretical studies

Academic culture – the culture of a university; an intellectual and ethical system of values, motivations, beliefs and perceptions that shape professional practice in education and science; a system of values, traditions, norms, rules, models of conduct for conducting scientific research, methods of activity and principles of communication, based on pedagogically adapted experience of scientific cognitive activity.

Academic culture covers: the educational institution's code of honour; anti-corruption measures; norms of the academic environment; a high level of internal culture and awareness; respect for scientific research; and the fight against plagiarism.

The code of ethics of an academic institution defines the general philosophy of the functioning of a university or scientific institute, reflects and protects the positive cultural traditions formed in it, supports the values of integrity of the team.

Academic freedom – the autonomy and independence of participants in the educational process during the implementation of pedagogical, scientific-pedagogical, scientific and / or innovative activities, carried out on the principles of freedom of speech and creativity, unhindered dissemination of knowledge and information, conducting scientific research, as well as the use of relevant results. Academic freedom is implemented taking into account the restrictions established by law.

Academic freedom includes three fundamental freedoms:

- *Freedom of research*. The free choice of topics, areas of study and methodologies for academic research, as well as the testing and presentation of research findings.
- *Freedom of teaching*. The lecturer's right to form their own opinion regarding the choice of teaching methods and the pedagogical and methodological support for the discipline.
- *Freedom of learning* (acquisition of knowledge). The student's right to independently choose a course of study and forms of learning.

Academic integrity refers to the set of ethical principles and rights that must guide those involved in the educational process during their studies, teaching and research activities. Adherence to academic integrity includes: citing sources of information; complying with copyright legislation; and providing accurate information regarding the results of research conducted.

Issues of academic integrity in Ukraine are regulated by: the Ministry of Education and Science of Ukraine; the State Service for the Quality of Education of Ukraine; the National Agency for Higher Education Quality Assurance; and the National Academy of Sciences of Ukraine.

Regulatory and legal support for the implementation of the principles of academic integrity:

- The Law of Ukraine 'On Education';
- specific laws of Ukraine 'On Higher Education', 'On Vocational Education', 'On Pre-Higher Vocational Education',

'On General Secondary Education', 'On Preschool Education'; 'On Out-of-School Education';
- the Law of Ukraine 'On Scientific and Scientific-Technical Activity';
- regulatory acts of the Cabinet of Ministers of Ukraine and central executive bodies responsible for educational establishments and/or scientific institutions;
- statutes and other internal regulatory documents (codes of honour, internal regulations, procedures for decision-making on matters of alleged breaches of academic integrity, etc.) of educational establishments and scientific institutions.

Regulatory documents of higher education institutions should regulate: academic responsibility for violation of academic integrity; the procedure for establishing and proving the facts of violation of academic integrity; ways of making decisions on academic responsibility for failure to comply with academic integrity; appeal procedures for participants in the educational process who are accused of violating academic integrity.

***Principles of determining academic integrity*:** honesty, trust, fairness, respect, responsibility, transparency and publicity, courage.

Table 10 – **Maintaining academic integrity involves**

For scientific and pedagogical staff	For students
1	2
Citation of sources when using ideas, statements or information	Independent completion of learning tasks, as well as tasks for ongoing and final assessment of learning outcomes (for individuals with special educational needs, this requirement is applied taking into account their individual needs and abilities)
Compliance with copyright legislation	Citing sources of information when using ideas, statements or facts

End of Table 10

1	2
Presentation of reliable facts regarding research findings and one's own pedagogical (scientific-pedagogical, creative) activities	Compliance with copyright legislation
Monitoring of academic integrity	Providing accurate information about the results of one's own academic work

Academic liability is a form of liability applied to a person who has breached the standards of academic integrity.

Academic liability for breaches of academic integrity:

I. *Scientific and pedagogical staff*:

1. Refusal to award an academic degree.
2. Revocation of an academic degree.
3. Disqualification from participating in the work of bodies specified by law and from holding certain positions.
4. Dismissal of scientific and pedagogical staff.

II. Student:

1. Retaking the assessment (test, exam, etc.).
2. Revisiting the course.
3. Notification to parents or other persons (individuals or legal entities) who pay for tuition;
4. Expulsion from an educational institution (except for general secondary education institutions).
5. Disqualification from taking part in competitions for scholarships, grants, participation in academic mobility with the support of the educational institution (scientific institution) where the student is studying for a period of up to one academic year.
6. Entry into the register of violators of academic integrity.
7. Deprivation of tuition fee benefits provided by the educational institution.

Academic plagiarism – the presentation of scientific results obtained by others as the results of one's own research and/or the reproduction of published texts by other authors without indicating authorship.

Types of plagiarism:

- literal plagiarism – the literal borrowing of text fragments without formatting them as quotations with a reference to the source;
- mosaic plagiarism – the combination of phrases and text from several sources in a single work.
- using information from a source without citing it;
- inadequately paraphrasing the source text in a form that closely resembles the original text; presenting generalised ideas, interpretations or conclusions from a specific source without citing it;
- translating an academic text without citing the original source;
- rewriting – 'retelling' someone else's text in one's own words whilst accurately preserving the original content;
- replication – the publication of the same article;
- combining original and borrowed text without properly citing sources;
- copying another person's academic work (or works) and publishing the result under one's own name;
- fabrication (inventing certain data);
- duplication of research – an unofficial agreement between two or more people, resulting in the production of identical (or similar) work;
- compilation – the deliberate assembly of text from several sources.

Self-plagiarism – publication of one's own previously published scientific results as new scientific results.

Examples of self-plagiarism:

1. Duplication of publications – publication of the same scientific work in several editions, as well as re-publication of previously published articles, monographs, other scientific works as new scientific works.
2. Duplication of scientific results – publication of the same scientific results in different articles, monographs, other scientific works as new results published for the first time.

3. Presentation in reports on the implementation of scientific projects of results contained in previous works as obtained in the process of implementing the relevant project.
4. Aggregation or addition of data – combination of old and new data without their clear identification with appropriate references to previous publications.
5. Disaggregation of data – publication of part of previously published data without reference to the previous publication.
6. Re-analysis of previously published data without reference to the previous publication.

Self-plagiarism does not include: reprints (stereotypical or reworked and/or supplemented) of monographs, textbooks, study guides, other works containing the results of scientific, educational or creative activity, which provide information about the reprint and/or reference to the first edition; limited use in new monographs, textbooks, study guides of fragments of previously published works of the author, if the new work provides the relevant information, and the scope of duplication is agreed with the publisher and customers of the publication.

An anti-plagiarism programme is a computer programme that compares a text document with a specific set of other documents and identifies passages that appear in multiple documents simultaneously. These programmes do not detect matches in texts written in different languages; in carefully paraphrased texts; or in texts not available on the internet. Percentage matches refer to textual matches in correctly formatted quotations; the names of institutions where the research was conducted; standard words and phrases; and the author copying text from their own article into the text of the thesis.

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У методичних рекомендаціях схарактеризовано сучасні технології в умовах модернізації вищої освіти; з'ясовано прерогативи використання інформаційно-комунікаційних технологій навчання; особливості провадження проєктної діяльності й залучення веб-квестів до навчальних занять; обґрунтовано специфіку дистанційного навчання як цілеспрямованого процесу інтерактивної (ділової) взаємодії викладача й студентів; проаналізовано різні види медіаконтенту: інфографіка, майнднепінг, інтернет-меми, які покликані супроводжувати репрезентацію теоретичного матеріалу освітніх компонентів; досліджено особливості оцінювання рівня компетентності здобувачів освіти (тестовий контроль), доведено переваги гейміфікації в освітньому процесі; звернуто увагу на дотримання академічної культури в закладі освіти.

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