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THE LATEST FORMS AND TECHNOLOGIES FOR TRAINING FUTURE SPECIALISTS:

methodological materials

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SECTION 1. THE LATEST FORMS AND TECHNOLOGIES OF TRAINING FUTURE SPECIALISTS

Modern forms of organizing lecture classes

Revising traditional approaches to the organization of the educational process and introducing new forms of learning in the context of the environment approach is one of the priority areas for achieving a high level of professional training for bachelors of publishing and printing.

The form of organization of the educational process is a way of organizing, constructing and conducting classes in which the content of academic work, didactic tasks and teaching methods are implemented. Particular attention should be paid to the problem of organizing lectures and laboratory classes and independent work of students.

When organizing lecture classes, it is extremely important to find new ways to move from passive transfer of educational material from the teacher to the students to ensuring active and fruitful interaction in the teacher-educational material-students system. This, in particular, is achieved by using new modern forms of lectures.

An academic lecture is one of the main forms of organizing the educational process at a university. In a generalized sense, a lecture is a systematic, consistent presentation of educational material, the main purpose of which is to form a focused basis for students to learn. Despite a long history of use: from readings in the squares in the ancient world and university lectures in the Middle Ages, the lecture as a form of organizing learning does not lose its relevance. After all, a lecture in higher education is not a simple retelling of a textbook - it is a multifaceted phenomenon that cannot be replaced by reading out a finished text, it is the personal scientific

and pedagogical creativity of the teacher, taking into account a number of aspects: from the composition of the material to the methods of activating attention [30]. The main purpose of the lecture is to provide a theoretical basis for learning, to develop interest in learning activities and a specific academic discipline, to form students' guidelines for independent work on the course [60].

The lecture form of organizing classes has the following advantages [3]:

- it provides creative, emotional, direct interaction between students and the teacher; activates the thinking activity of students;
- saves students time in obtaining a large amount of structured material;
- allows personalizing training, taking into account the interests and level of training of the audience;
- makes it possible to guide students in independent work, to interest and orient them in scientific research.

At the same time, the traditional lecture has negative aspects, in particular: focusing on the auditory memory of students; lack of the ability to effectively manage the mental activity of students; passive perception of the material by students; not very suitable for junior students who have poor knowledge of the methods and techniques of perceiving the content of the lecture and taking notes.

To minimize the disadvantages of the traditional lecture, practitioners are constantly looking for new ways to improve lecture classes and, consequently, to improve the quality of training of future specialists. Thus, the problem lecture, the press conference lecture, the two-man lecture, and a particularly interesting form of lecture, the visualization lecture, have emerged.

Visualized lecture

A visualized lecture is a format for presenting educational material when oral information (explanation, narration) is transformed into a visual form. Visualization in education is seen as [66]:

- first, a type of visualization with a dominant illustrative function;
- second, as a means of influencing the psychological and physiological processes that occur in the process of visual perception, resulting in the formation of associative relationships that contribute to better perception and assimilation of educational material;
- third, as a conversion of mental contents, including various types of information, into a visual image that can serve as a basis for adequate mental and practical actions.

The main didactic advantage of a visualized lecture is that the process of visualization is a collapse of mental operations by creating a visual image with different types of information, which can serve as a support for mental and practical actions. Also, any form of visual information contains elements of problematic nature, so a lecture-visualization helps to create a problematic situation, the solution of which is based on analysis, synthesis, generalization, collapse or expansion of information, i.e. with the inclusion of active mental activity. In addition, traditional forms of lectures are based on the teacher's oral speech, and students learn about 15% of the information presented. A lecture-visualization makes it possible to use the visual analyzer in addition to the auditory analyzer, to rely on imaginative thinking, as a result of which up to 65% of information is absorbed [45].

Preparing such a lecture involves transforming traditional content into visual forms through technical learning tools. It is appropriate to use drawings, pictures, diagrams, schemes, charts, etc. as forms of visualization

that can be used to encode and demonstrate educational information. It is important that the prepared demonstration materials not only complement the teacher's verbal information, but also act as carriers of meaningful information themselves.

Multimedia lecture

With the development of information technology, lecture-visualization has reached a qualitatively new level and has been implemented in multimedia form. A multimedia lecture is a form of organizing learning activities that involves multisensory presentation of material.

The problem of introducing multimedia lectures into the educational process is of great interest to domestic and foreign scholars. The analysis of scientific works has shown that scientists are unanimous in their opinion on the didactic potential of using multimedia technologies in lectures, as it helps to ensure an increased understanding of the educational material, better memorization, increased learning motivation, etc.

At the same time, poorly designed materials can cause significant harm. Failure to take into account a number of technical, technological, pedagogical, psychological, and ergonomic factors can lead to a violation of the logic of the material presentation, a shift from scientific to illustrative content, and cause information and emotional overload for students. In addition, it is important to take into account the specifics of each discipline, because not all multimedia lectures are justified.

Multimedia technologies provide the teacher with unique opportunities that were not available in traditional and visualized lectures: to present educational material not just in a visual form, but in an integrated way, by combining text, graphics, photos, animation, videos, 3D models, with sound. In addition, the demonstrated material becomes manageable, the teacher can

return to the desired fragment and repeat it as many times as necessary, stop the display, go to other resources or access the Internet. And finally, such lectures not only have a multisensory impact on students, but also affect their emotional sphere, making the class emotionally attractive and interesting.

With the use of multimedia lectures, classes become more intense and dynamic, creating conditions for better understanding and active learning of the material, and its lasting memorization. It increases motivation and attracts the attention of students, makes learning interesting and emotional, bringing aesthetic pleasure to students and improving the quality of teaching.

A multimedia lecture is not just a bunch of media tools, it is a full-fledged product, basically a presentation, implemented with the help of appropriate software tools (PowerPoint, Google Presentations, Prezi, etc.), with a detailed script. As noted in work [40] the process of developing a multimedia lecture should include three scenarios:

- development of a pedagogical scenario for multimedia lectures;
- development of a computer scenario (preparation of text, illustrations for multimedia lectures, selection of technologies and tools);
- direct creation of multimedia lectures and their use in the educational process.

A specific feature of multimedia lectures is that they are a central component of the university's educational environment, a comprehensive, structured source of educational material. Due to its technical parameters, a multimedia lecture can be easily integrated into the modern information educational environment of a university, and due to its aesthetic appeal (unlike even an electronic lecture note), it will not be overlooked by students.

What characteristics should a multimedia lecture have as part of the university's educational environment? First of all, a multimedia lecture

should contain all the educational material presented in a clearly structured way. It should be non-linear and interactive, providing opportunities to quickly find the necessary information on a particular issue. And most importantly, it should provide unlimited access to the information presented, which will virtually erase the time and space limitations of the participants in the educational process in mastering the educational material.

Another alternative, original and at the same time effective way to conduct lecture classes in the disciplines of professional training of bachelors in publishing and printing is a lecture-excursion.

Lecture-excursion

A lecture-excursion is an unconventional type of lecture that is not held in a regular classroom, but involves a visit directly to practical units, museums, exhibitions, etc. The environment itself becomes a kind of visualization that cannot be reproduced in an educational institution. [53].

The main goal of this form of learning is to observe and study various objects and phenomena of reality, to ensure maximum activity and independent mental activity, to develop skills of independent observation and analysis of visual information and impressions.

Lecture-excursions may include visits to enterprises and industries, museums, and other places directly related to the educational material. This format allows students to see the practical application of the theory, get acquainted with real processes and gain a deeper understanding of the subject.

Creating a new excursion on any topic is a complex process that requires the active participation of a whole team of employees. The content of the future tour and its cognitive value directly depend on the knowledge of teachers and guides, their competence, the degree of practical knowledge of

the basics of pedagogy and psychology, and the ability to choose the most effective ways and methods of influencing the audience [61].

In addition, conducting lecture tours has a number of difficulties: time constraints (you need to get to the tour base, sometimes the necessary institutions or organizations are located in another city or even country; the time allotted for the class is sometimes not enough to see all the objects in detail); weather conditions; physical fatigue; financial costs (payment for travel and entrance tickets, payment for a guide, etc.); organizational costs (obtaining permits from the university and the tour base).

The use of modern information and communication technologies makes it possible to avoid all of the above disadvantages inherent in traditional lecture tours and conduct virtual lecture tours, ensuring accessibility, interactivity and flexibility of learning for students regardless of their location.

Virtual lecture-excursion

A virtual lecture-excursion is an organizational form of education that differs from the real one by virtual display of existing objects [58].

This is a form of organization of the educational process that provides a visual demonstration by digital means of virtual display of real objects (parks, museums, exhibitions, galleries, industrial or natural objects), for the purpose of independent familiarization, observation, study, description of these objects, collection of necessary visual information to meet leisure, entertainment, scientific, cognitive or educational needs [39]. According to scientists [39], the didactic potential of virtual tours lies in the fact that they contribute to the expansion of the academic experience of students by providing them with the opportunity to visit a wide variety of industrial

environments, laboratories, heritage sites, and other places that are inaccessible or difficult to visit in real life.

Physically being in the classroom at the workplace, students experience the complete illusion of presence, overcoming territorial boundaries and time limits. In addition, students get a number of additional features that are not available in a real tour: zoom in and out of objects, look around, examine individual details in detail, view the panorama from afar, look up and down, approach or move away from a selected point, move from one panorama to another through active zones, for example, walk through individual rooms, etc., and all this can be done at the right pace and in the order convenient for a particular viewer. This way, for example, you can walk around the entire printing house from the inside and even inspect it from the outside, or take a virtual trip to a museum on another continent without leaving the classroom. You can visit several sites in one class: museums, exhibitions, and institutions.

To view a virtual tour, you do not need to install any additional software - Internet access is sufficient. The organization and conduct of a new virtual lecture-tour consists of the following stages [61]:

- preparatory (defining the goal; selecting the object of study; searching for Internet resources; formulating problems and tasks; creating a guide for students to sites; selecting the form of a report or visualization of the tour results)
- development of the excursion (drawing up a route; processing of factual material; work on the content of the excursion, writing a control text; work on the methodology of the excursion; selection of the most effective methodological techniques);
- directly conducting a virtual lecture-tour;
- final stage.

The use of virtual lectures and excursions makes the learning and teaching process more interesting, qualitative, and effective. It intensifies the learning process, creates conditions for the development of independent work skills, students' interest, and professional motivation, and connects learning with practice.

In the context of the environmental approach to the organization of university education, other forms of lectures are also of interest, which motivate students to learn, and make access to knowledge possible without any spatial and temporal restrictions [35]. For example, a lecture-conference and a lecture-webinar.

Lecture-conference

Lecture-conference is a class format that combines elements of both lectures and conferences. A lecture-conference is held in the form of a scientific and practical class, organized as speeches by participants on a pre-set problem. The totality of the presented speeches allows for a comprehensive coverage of a particular problem. The function of the teacher in this class format is to manage the preparation of reports for the lecture, support students during the presentation, and summarize the knowledge gained [53].

The use of information and communication technologies can turn an ordinary reading of reports into an exciting competition of speakers and creators. Using graphic editors and presentation programs, participants can demonstrate interesting and original speeches, showing both their knowledge of the material and their ability to use modern technologies.

Lecture-webinar

A webinar lecture is an online analog of a lecture that is realized online using Internet technologies. During a webinar lecture, participants and facilitators communicate live via the Internet in remote geographical locations, using shared virtual platforms and interacting in real time in a ubiquitous and synchronized manner using voice over IP technology and webcams. [9].

At a webinar, the main organizer and speaker is a teacher (or invited specialist) - a facilitator who plans and coordinates all learning activities that take place within the webinar and, if necessary, gives the floor to other participants. Webinars usually cover a single topic, and participant interaction is often limited to polls and direct questions to the presenter.

The latest learning technologies

The introduction of the latest technologies into the university's educational process is an important step in intensifying learning, a way to increase the motivation and cognitive interest of students, and to provide conditions for self-study and scientific and creative research. [36].

According to UNESCO, pedagogical technology is a systematic method of creating, applying, and defining the entire process of teaching and learning, taking into account technical and human resources and their interaction, with the aim of optimizing forms of education. [1]. Educational technology refers to the set of digital tools, resources, applications, and methodologies used to facilitate teaching and learning. [21].

Modern (newest, innovative) educational technologies at the university are scientifically based and regulated by the purpose of training, content of education, place and term of study, the system of forms, methods, means and procedures used to organize and implement joint educational activities of teachers and students. [47]. As noted by scholars [21], modern educational technologies include software, online platforms, hardware devices (such as tablets, computers, and interactive whiteboards), and assistive technologies aimed at improving access to education, personalizing learning paths, and facilitating more dynamic interaction between students and teachers.

Taking into account the requirements of modern society and the labor market, it is important to develop and implement educational technologies in the educational process aimed at ensuring quality training of future specialists [32]. Among the variety of modern educational technologies, the following technologies have a special didactic potential in the professional training of future publishing and printing specialists [51]: electronic portfolio, case technology, business game, web quest, etc.

E-portfolio

Portfolio technology is attracting more and more attention from both academics and practitioners. A portfolio is intuitively understood as a folder for documents. It is a collection of documents, works, and photographs that provide an idea of the capabilities of a particular specialist. In general, a portfolio has long been an attribute of representatives of creative professions (artists, architects, photographers, etc.).

In education, portfolio technology was first used in the United States in the 80s of the last century as a way to collect various kinds of publications. Later, portfolios began to be used as an alternative method of assessing the learning performance of students and applicants. The "portfolio approach" quickly gained popularity and in the 90s began to spread in Europe, Canada, and Japan. [25].

Currently, there are a significant number of interpretations of the learning portfolio that reveal different aspects of this concept. Most often in educational practice, a portfolio is considered as [3; 54; 29; 44]:

- a collection, a collection of works of an education applicant that clearly demonstrates his/her efforts, progress, achievements in a particular field;
- an alternative way to assess the achievements of students;
- a new way of organizing educational work that changes the specifics of interaction between the teacher and the student;
- a tool for self-organization, self-knowledge, self-assessment, self-development and self-presentation of the student.

Portfolio technology is a system that integrates tools, methods, and techniques for organizing learning activities, which contributes to the development of systemic thinking through organized work with information.

For a long time, a portfolio was a tangible object - an ordinary folder with various documents in it. With the development of e-education and the

widespread use of information and communication technologies in the educational process, educational technologies have also begun to change, gradually becoming electronic. The portfolio technology was no exception, when since the 1990s teachers began to develop and use its electronic version - an electronic portfolio (e-portfolio) in teaching.

In general, an e-portfolio is considered to be a collection of materials presented in digital form on a website or electronic media, consisting of text, graphic or multimedia elements and demonstrating the experience and achievements of applicants in the process of learning. But this is only in material form, the meaning of an e-portfolio is much deeper. Indeed, an e-portfolio is a kind of digital container for heterogeneous multimedia content. However, in the current conditions, as predicted by scientists [3], e-portfolios are becoming a kind of pedagogical extension of the digital learning environment, integrating into the content design and delivery system.

E-portfolios can be classified according to several key criteria, including the purpose of use, expected performance, type of information presented, and nature of the materials included. In addition, an important aspect is the number of people involved, as well as the specifics of the activity. Different researchers [27; 44] offer their approaches to systematizing this technology. Figure 1 shows a general classification of e-portfolios that covers the main criteria.

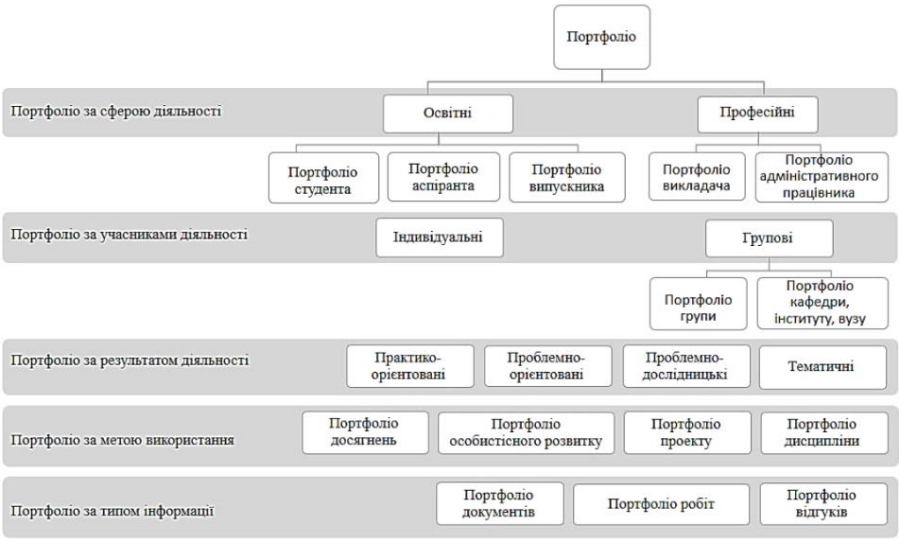

Figure 1. Classification of portfolios

The effectiveness of using portfolio technology in the educational process is confirmed by both international experience (Inter/National Coalition for Electronic Portfolio Research, Euro Portfolio Consortium, Danish Consortium fore Portfolio) and the practice of domestic educators. [27; 64; 57]. The following e-portfolio capabilities can be distinguished: assessment of students' academic achievements, their creative and critical thinking; motivation to study, research, creative activity; realization of students' self-assessment; encouragement to interact. According to O. Berezhna and T. Andriushchenko, “the educational portfolio promotes the motivation of students to self-education, the development of independence, responsibility, initiative as the main factor in improving the effectiveness of student learning and the possibility of self-realization in the learning process” [27].

As for the structure of the portfolio, there are different views on what it should look like. It all depends on the purpose of creating a portfolio, the purpose of use, the methods of implementation, the specifics of the discipline

within which this technology is used. For example, O. Ivanova [44] describes the structure of a portfolio that includes three blocks: conceptual, procedural and content, and effective. The conceptual block includes: a brief description of the problem; references and literature; project goals and objectives; research methods and techniques. The procedural and content block of the portfolio is a kind of accumulator of works that give an idea of the course of the research. The resultant block demonstrates materials on the conclusions of the project work.

If we consider an e-portfolio as the final product of student work, we can distinguish the following components: title, portrait, learning materials, and independent work.

Title is the front page with the title of the paper (the name of the academic discipline, the topic of the assignment, etc.). The main purpose of the title is to attract interest, create the appropriate atmosphere, and set the mood for the material.

Portrait is the author's introduction page, which may include a photo, resume, or a story. The purpose: to introduce yourself, demonstrate your personal and professional qualities, and the level of your achievements.

Learning materials - the main content of the portfolio, the student's work (completed assignments, reports, etc.). Purpose: to present the work done in the classroom.

Independent work - thematic materials, own work done outside of class. Purpose: to demonstrate the ability to work creatively and independently.

An important point in the use of e-portfolios in the educational process is the availability of clear evaluation criteria. One of the possible options is to use four levels of assessment:

- high — the portfolio demonstrates great efforts in the development process, progress in the development of creative, critical thinking, a high level of applied

skills, self-esteem and creative attitude to the subject, originality and ingenuity of development;

- sufficient — the portfolio demonstrates good knowledge and skills of the student, some elements from optional categories are missing, the originality of the content and design is not sufficiently expressed;

- average — the portfolio shows a certain level of formation of program knowledge and skills in the disciplines, there is no evidence of the level of development of creative, critical thinking, applied skills, ability to meaningful communication;

- low — rather uninformative portfolio, which makes it difficult to judge the student's own abilities, fragmentary, incomplete tasks, it is difficult to determine the progress in learning, the level of formation of qualities that reflect the main goals of the disciplines and assessment criteria.

Case-study

Case-study as an educational technology has come a long way: from its first use in the educational process at Harvard Business School in the early twentieth century, to its widespread use in the world in the 70s and 80s, to its current popularization in educational practice.

Case technology in education is a series of specific learning situations that are specially developed on the basis of factual material for further analysis in the classroom [42]. These can be real or hypothetical, but realistic/practical situations in which a person or a group of people face a problem or challenge [13].

The essence of the technology is the use of specific cases (situations, stories, the description of which is called a “case”) for independent study or teamwork: joint analysis, discussion, identification of the main problems and development of alternative solutions by students in a particular section of the discipline [42].

This allows students to acquire the knowledge and skills necessary to analyze and solve the problems they face, as well as to develop information-based solutions in real-life situations similar to those under consideration.

The main goal of case-study is to narrow the gap between theory and practice, to bring the learning process closer to reality by simulating professional activities. This is possible due to the assistance of cases in the development of a number of necessary professional skills. The skills that the case develops [42; 13; 26; 15]:

- analytical skills (the ability to distinguish data from information, classify, distinguish essential and non-essential information, analyze, present and extract it; think clearly and logically);
- practical skills (formation of practical skills to use the acquired theoretical knowledge);
- creative skills (generation of alternative solutions);
- critical thinking skills;
- communication skills (the ability to conduct a discussion, persuade, use visual material and other media, cooperate in groups, defend one's own point of view, persuade opponents, and write a short and convincing report);
- social skills (assessing people's behavior, listening, supporting in a discussion or arguing opposing opinions, self-control).

To be as effective as possible, the case should meet the following requirements [43; 13]: the problem is taken from real life; the problem is related to the educational material being studied; problem questions should be based on students' previous experience and knowledge; the problem should give direction to cognitive search, indicate the direction to its solution; the case indicates the elements of the surroundings; the case includes information sufficient to

consider problems and issues; it should contain the optimal amount of information; have a multivariate solution to the problem, provide interest.

За тривалу історію, створено і впроваджено в освітню практику велику кількість кейсів, які можна розділити на групи за різними ознаками: за структурою, за об'ємом, за змістом, за матеріальною реалізацією тощо. Залежно від навчальної ситуації, можливе поєднання кількох видів кейсів.

Depending on the structure, there are different types of cases [35; 36; 33]:

- structured cases (characterized by a concise and accurate presentation of the situation with specific data; the presence of a certain number of correct answers that can be arrived at by mastering one formula, methodology in a particular field of knowledge; the presence of an optimal solution)

- cases of a large volume, with detailed information; when solving, it is necessary to clearly understand the conditions; has several correct answers; designed to assess the speed of thinking, the ability to separate the main from the secondary;

- unstructured cases (contains the main text and appendices; key concepts; when solving the case, you need to rely on your own knowledge);

- cases designed to assess the ability to think outside the box and develop creative ideas.

The cases are divided into:

- full cases (20-25 pages on average; intended for group work over several days);

- brief cases (small volume (3-5 pages); designed to be analyzed directly in class; involve a general discussion);

- mini-cases (small volume (1-2 pages); intended for analysis in class; used as an illustration of what is being considered in class).

The following types of cases are distinguished by their content:

- case study (a short case that tells about a specific case; can be used during a lecture to illustrate a certain idea or raise questions for discussion; requires little time to read, so students do not need to prepare for the class in advance)

- case study (provides students with the opportunity to apply the acquired skills in practice; used for quantitative analysis);

- case study (requires the student to analyze the situation; requires a lot of time for familiarization, requires prior preparation for the class).

Cases on material realization:

- text cases (material is presented in paper or electronic form with possible inclusion of illustrations);

- video cases (material is presented in the form of videos);

- multimedia cases (material is presented in the form of a combination of text, graphic, audio and video information).

According to the tasks they perform, cases can be divided into:

- mini-cases

- cross-cutting cases;

- generalizing cases;

- interdisciplinary cases.

Advances in technology have greatly improved case-based learning. Digital platforms and tools offer new ways to present cases, facilitate discussions, and assess learning outcomes [15]:

- online discussion forums (virtual discussion platforms allow for asynchronous or synchronous case discussions, making it easier for students to collaborate and exchange ideas regardless of location);

- data analysis tools: (the use of tools that analyze the participation and performance of students can provide valuable feedback to teachers and help adapt the learning process to individual needs);

- VR/AR (the ability to create immersive case scenarios, allowing students to experience complex environments and interact with them in controlled conditions).

Depending on the training situation, several types of cases can be combined.

The cases used at the university have significant requirements to ensure their quality. A case that meets the following characteristics is considered to be of high quality [43]:

- skillfully formulated story,
- application of an important problem,
- description of a dramatic situation with the need to make a critical decision,
- the presence of specific comparisons,
- providing an opportunity to generalize conclusions,
- the presence of a central character,
- providing an opportunity to evaluate the effectiveness of previous decisions,
- optimal size and volume of information,
- the existence of a multivariate solution to the problem,
- ensuring the audience's interest in solving the problem,
- stimulating group work and teamwork,
- promoting the formation of leadership qualities.

The introduction of case technology into the educational process requires a significant investment of time and effort by the teacher, as well as the efforts and diligence of the students.

The work of a teacher in using cases includes two stages. The first stage is a complex creative work of creating a case and questions for its analysis. This type of work is carried out outside the classroom. It is a research and methodological work. A well-prepared case is not always enough to conduct an

effective class. To do this, it is necessary to carefully prepare methodological support for both students' independent work and classroom instruction. The second stage involves the teacher's activities in the classroom, where he or she makes introductory and concluding remarks, organizes a discussion, maintains a businesslike mood in the group, evaluates students' work and analyzes the situation.

Students work on the case study in the following stages:

- receiving the assignment, familiarization with the case material,
- defining the problem,
- distribution of responsibility (in case of group work),
- accumulation and analysis of proposals,
- combining all parts into a single solution and structuring,
- solving the problem,
- making a presentation,
- presenting and discussing the results.

The key components of case-based learning are [15]: the case itself, which includes a description of a specific situation, problem or dilemma; learning objectives (skills or knowledge that the case is aimed at developing); discussion and analysis (identifying key issues, considering different points of view, proposing solutions); application (the solutions developed may require practical application in the form of role-playing, simulations or developing action plans); reflection (reflection on the learning process and results is encouraged to deepen understanding and consolidate learning).

In the context of professional training, case studies can be used without formal assessment, but evaluation of students' work with cases is desirable. As noted by experts [13], given the group and collective nature of the case study, the evaluation of participation in the case study is often subjective. To ensure a

more objective assessment, the authors suggest using rubrics that provide both holistic assessments (“very good”, “good”, ‘satisfactory’, “poor”) and detailed criteria that cover the depth and breadth of analysis, personal involvement, collaboration, and interaction between participants.

Game-based Learning

Game technology is a specially built system of clear effective actions aimed at the formation, development, expansion, and generalization of knowledge in the learning process [52]. The use of game technology in the educational process is not an invention of today. This technology has a long history, dating back to Ancient Greece and China, substantiated by such great teachers as J.-J. Rousseau, H. Skovoroda, K. Ushinsky, and J. Comenius.

One of the most popular types of educational games is a simulation game. The analysis of scientific works has shown different approaches to the interpretation of this concept, which is considered as:

- a pedagogical tool and an active form of learning that intensifies learning activities by modeling managerial, economic, psychological, and pedagogical situations, and makes it possible to analyze them and develop optimal actions [28];

- modeling of real activities in a specially created problem situation [56];

- training and practical training, which involves modeling the activities of specialists and production managers to solve a complex problem, making a certain decision related to the management of the production process [49].

The generalization of different interpretations shows that a simulation game is an interactive educational technology that consists in the organization by the teacher of orderly teamwork aimed at forming students' professional competencies by simulating real activities in a specially created problem situation. The simulation game offers a transition from “vertical”

communication between teachers and students, forming relationships along the “horizontal”. This develops the basis for a free, creative relationship of equally informed partners. "The teacher is not a direct partner, but a secondary one. This circumstance removes a certain psychological barrier to communication and frees students. The student fills the role with individual means of self-expression, the struggle for professional and intellectual recognition in the group." [14, c. 161].

The simulation game has a powerful didactic potential and performs a number of functions [42; 43; 44]:

- approximation, preparation of students for professional practical activity, formation of an idea of professional activity in its course;
- development of professional qualities;
- development of students' skills of professional critical and evaluative thinking, including a holistic understanding of not only nature and society, but also of themselves and their place in the world;
- increasing the independence of future specialists;
- reduction of time for accumulation of professional experience;
- strengthening professional motivation and interests;
- introduction of the spirit of creativity in education;
- gaining social experience (development of communication competence, decision-making skills, teamwork), etc.

Thus, a simulation game is an imitation of future professional activity, a learning environment where a student undertakes to perform various professional roles. The student enters the world of the educational game as in life: he begins to act, learning the invisible boundary between reality and conventionality, learns the best examples of professional actions, produces more

effective options for professional activity, which helps him in finding its meaning and forming professional competence [55].

Simulation games are used in the educational process of higher education institutions as a pedagogical technology or one of the methods of active learning, in conducting social and psychological training, in solving industrial, social and psychological problems that a graduate may encounter in his or her professional activity [16].

The characteristic features of business games are as follows [65]: the presence of a problem, goal, tasks; reduction of the time scale; distribution and acting out of roles; presence of situations that are solved sequentially; several stages of the game; formation of independent decisions of students; availability of an incentive system; consideration of possible obstacles; objectivity of the game results assessment; summarizing.

The simulation game consists of two stages:

- designing the game, when the main activity is assigned to the teacher, who: models a fragment of professional activity and the relationship of people involved in it, formulates the problem and tasks, defines roles;

- conducting the game, where the main role is assigned to students, who independently divide into groups, choose roles, communicate, look for ways to solve the tasks, and the teacher only controls the process.

Of course, these two stages, in turn, consist of a number of important sub-stages [12]: defining the purpose of the game; choosing the context and defining roles; introducing the task to the participants; preparing for and implementing the task by students; presenting the result; final discussion and evaluation.

Different types of simulation games are used to achieve educational goals in education.

By the time of conducting:

- games without time limits (designed for a long period of time (semester, module);
- require a detailed plot and tasks; high level of student independence;
- remote assessment of student performance);
- with time limits (designed for small time periods (one or more classes);
- allows you to track the dynamics of student activity);
- in real time (small game situation; conducted during a classroom session;
- requires significant teacher activity; instant assessment of student performance).

By the number of participants: a game in pairs; a game in groups; a game in groups divided into subgroups.

By activity evaluation:

- each participant is evaluated (individual approach; assessment of personal qualities; development of self-awareness and self-organization);
- the group is evaluated (collective responsibility; development of team spirit; flexibility).

According to the final result:

- games with strict rules (ensuring students' organization; predictability);
- open games (ensuring students' self-organization; responsibility of activity).

By methodology: role-playing, group, simulation, organizational, innovative, ensemble;

By application: industrial, educational, qualification.

Simulation games have both positive and negative aspects [46]. Positive aspects include high motivation, emotional intensity of the learning process; preparation for professional activity, knowledge and skills are formed, students learn to apply their knowledge; post-game discussion helps to consolidate knowledge. Negative aspects include high labor intensity for the teacher, who must be an attentive and friendly leader throughout the game; more stress for the teacher, focus on continuous creative search, possession of acting skills; students' unpreparedness to work with a simulation game; difficulties with replacing the teacher who conducted the game.

When creating business games, it is important to adhere to a number of methodological requirements [63]:

- the game should be a logical continuation and completion of a specific theoretical topic of the discipline, a practical complement to the study of the discipline as a whole
- maximum approximation to real professional conditions;
- careful preparation of educational and methodological documentation;
- clearly formulated tasks, conditions and rules of the game;
- tasks should be relevant, requiring basic knowledge, imagination and creative abilities of students;
- tasks should be sufficiently complex, but accessible for solving, should encourage the use of existing knowledge and the search for new principles, facts, and methods of solution;
- creating an atmosphere of search and ease;
- identifying possible solutions to the problem;
- availability of necessary equipment.

Organizing and conducting a simulation game is a long and laborious process. Preparing a simulation game is a multi-stage procedure and depends on a number of subjective or objective factors. With the development of

information and communication technologies, the creation and use of a simulation game has reached a whole new level: it becomes possible to transfer the game environment into the virtual world, use software and hardware, and present information about the game in electronic form, which significantly expands the range of possible scenarios, increases interactivity and provides greater flexibility in the learning process.

Quest Technology

The quest in education came from the gaming and entertainment sphere, where it was used in the literal sense of the word: “a long search for something that is difficult to find or an attempt to achieve something difficult” [5]. At the same time, it is one of the most common methods of plotting in literature and mythology, which involves the journey of characters to a certain goal by overcoming a number of difficulties.

In the early stages of the educational process, the quest was used as a kind of role-playing game, which consisted of students completing tasks by searching for possible solutions and choosing the most optimal one. According to I. Sokolova, a quest is a game technology that has a clearly defined didactic task, a game idea, a leader (mentor), clear rules, and is implemented to improve students' knowledge and skills [62].

With the development of computer technology and information technology, the quest has become one of the most common types of computer games, which consisted of performing tasks by characters, overcoming a sequence of obstacles to achieve the game goal. The idea of using the Internet and information and communication technologies to organize and conduct quests was first introduced into the educational practice of the University of San Diego in 1995 by Bernie Dodge [2]. According to the scientist's definition, a web quest is a

research-oriented activity in which most or all of the information processed by students comes from Internet resources.

The analysis of scientific works of domestic and foreign scholars has shown that webquest is a multidimensional phenomenon, which is considered as

- a set of methods and techniques for organizing research activities, for which students search for information using Internet resources for practical purposes [48];

- a problem task with elements of role-playing game, for the implementation of which the information resources of the Internet are used [31];

- mini-projects based on searching for information on the Internet [67].

That is, a web quest is a multifaceted phenomenon that simultaneously acts as a full-fledged educational product (website, electronic resource) and a means of organizing learning activities.

Given the professional training of future specialists, webquest is a modern educational technology that involves the use of the global information space and information and communication technologies to search, process and evaluate information in order to solve research problems related to future professional activities. [7].

Webquest is both a game and a project technology. On the one hand, it involves a game form of interaction between participants in the educational process, which contributes to the formation of skills to solve problems based on a competent choice of alternatives through the implementation of a specific plot [62]. On the other hand, a web quest involves solving an important problem [31]: finding rational ways to solve it, finding convincing arguments to prove the correctness of the chosen path, and justifying conclusions.

The following types of web quests can be distinguished:

- by the duration: short-term (performed during one to three sessions; the goal is to acquire and integrate knowledge; the result is the collection,

processing and assimilation of a large amount of new information); long-term (last from one week to a month; the goal is to expand and process knowledge; the result is a deep analysis of a whole complex of knowledge, transforming it in a certain way and demonstrating understanding of the material by creating a certain product);

- by the number of participants: individual; in mini-groups;
- by subject content: within the same discipline; interdisciplinary (more complex in development and implementation);
- by the dominant type of activity of the participants: role-playing; game; search; information; research; creative;
- by the mode of conduct: in real mode; in virtual mode; combined;
- by educational environment: traditional educational environment; informational educational environment.

Regardless of the type, to maximize its effectiveness, a web quest should contain at least the following parts [2; 48]:

1. Introduction, which provides background information: an overview of the quest, the scenario, and describes the roles and stages of the quest.

2. A task to be performed (accessible, feasible and interesting): a series of questions to be answered; a problem to be solved; a position to be defended; or other activities aimed at finding, collecting, processing information and presenting results.

3. The set of information sources needed to complete the assignment: web resources, documents available via e-mail or real-time conferencing, searchable online databases, and books and other documents physically available at the institution.

4. Description of the process that students must go through in completing the assignment. The process should be broken down into clearly described steps.

5. Guidelines for organizing the information received: it is important to clearly describe how students should present the results (answers to questions; descriptions; concept maps or cause and effect diagrams, etc.) and in what form (abstract, presentation, website, etc.).

6. Evaluation, description of the criteria and parameters for evaluating the web quest.

7. The conclusion that accompanies the closing of the quest reminds students of what they have learned and possibly encourages them to continue their search.

Webquest as an educational technology has a powerful didactic potential that contributes to [62; 59; 48; 8]: development of intellectual and emotional activity of students; development of creative thinking; purposeful motivation to the process of knowledge acquisition; ensuring the contextualization of learning; individualization of learning; formation of various types of student competencies: subject, interdisciplinary, and key competencies (informational, educational, cognitive, communicative, cooperative); self-expression of the learner; broadening of the worldview; enrichment with additional knowledge; development of competitiveness and leadership qualities of each participant; increasing responsibility for the results of activities and their presentation. In addition, using webquests helps students better understand the connections between different topics. They feel that their work is important and useful to others, and they begin to think about how they learn and what helps them in their studies.

However, the use of web quests can also have problematic aspects: there is currently insufficient research on a specific teaching strategy using web quests; there is no connection between web quests and certain disciplines; many quests were not very well thought out both in terms of teaching and design; technical limitations on the introduction of web quests into the educational process

(appropriate equipment, accessible Internet, etc.); organizational difficulties associated with the creation and use of web quests.

To get positive results from web quests in the learning process, you need to be very careful about their design and use. Only when they are used properly do they "provide an engaging way for students to solve real-world problems in a purposeful way." [20, C. 133]

A mandatory requirement for creating a web quest is the inclusion of problem-based tasks, which according to B. Dodge [2] can be of the following types:

- retelling (demonstration of understanding of the topic by presenting materials from different sources in a new format: creation of a presentation, poster, story);
- analysis (search and systematization of information);
- compilation (transformation of the format of information obtained from different sources);
- evaluation (justification of a particular point of view on the problem);
- persuasion (ability to persuade opponents or neutral persons);
- planning and design (development of a plan or project based on given conditions);
- self-knowledge (any aspect of personality research);
- journalistic investigation (objective research of information (distribution of opinions and facts);
- creative task (creation of a play, poem, song, video, website);
- scientific research (study of various phenomena, discoveries, facts based on unique online sources).

According to G. Taylor [60], a number of critical elements are necessary for the success of web quests, which, in the author's opinion, include

- simplicity — a simple, accessible approach is more conducive to achieving educational goals than the involvement of a large number of technologies and tools;

- design — it is important not only to develop a quest and a strategy for its implementation, but also to present it to students in an aesthetically pleasing way, with a clear structure and easy navigation;

- resources are the “core” of web quests, so when developing them, teachers should find good resources from reliable sources that have great potential;

- organization — web quests should follow a set schedule and be well organized; activities should be clear and simple;

- visualization — educators should be able to visualize activities and products before using webquests;

- Diversity — web quests should promote creativity and diversity of students' activities and products;

- quest element — web quests are effective when they are actually presented as quests rather than simple lists of tasks;

- educational component — web quests are intended for real students and teachers, so the topics should be aligned with the curriculum objectives and educational outcomes.

Developing a high-quality web quest is a complex, painstaking process that requires knowledge of teaching practices, students' abilities, the content of the discipline, and fluency in technological tools.

When using the web quest technology, the teacher's functions are as follows [62]: defining the educational goals of the quest, building a storyline, evaluating the final result and the process of the student's activity, ensuring the organization of search and research educational activities. And the main task of the student is to independently search for the necessary information, research and process it in order to solve the tasks. Based on the analysis of scientific works [2; 48]

and our own pedagogical experience, we can distinguish the following stages of implementation of webquest technology with the definition of the role of participants in the educational process.

Search stage: familiarization of the teacher with the resources available online, existing catalogs of websites for teachers, which gives impetus to further research; organization of resources in their discipline by the teacher in the appropriate categories (reference materials, project ideas); identification by the teacher of topics that fit into the curriculum of the discipline and for which there are relevant materials online.

Preparatory stage: determining a specific topic of the web quest (the teacher sets the topic, creates a problem situation, defines the roles of students or describes the scenario of the web quest, outlines a preliminary work plan); verbalization of the task (the teacher verbalizes a specific task within the chosen topic) - the output is methodological instructions in the form of a website or resource that describes the process of completing the quest in a clear, attractive and interesting way and clearly defines the final result; description of Internet resources - the teacher offers students a list of links to Internet resources (website names with addresses and a brief annotation).

Implementation Phase: Information Search – Students conduct the necessary information search on the Internet, utilizing the provided work procedure description (methodological recommendations developed by the instructor); organization and management of students' research activities (the instructor takes the position of observer and consultant, providing advice and guiding students' work as needed); processing of the obtained materials by students (analysis, comparison, synthesis, justification of position, etc.); preparation of the WebQuest presentation by students (result – a local website, web page, presentation, electronic resource, or printed publication), where it is advisable

to state the topic, goal, creation tools, sources used, and present the completed task; student presentations with demonstrations of their work.

The final stage: discussion; evaluation of the work done by the students themselves; summarizing (sharing impressions, jointly outlining the prospects for further research in this and other disciplines).

Evaluating the results of web quests is a particularly important element of their implementation. The evaluation criteria can be different. According to L. Zheleznyak [41], a web quest is a complex task, so the assessment of its implementation should be based on several criteria focused on the type of problem task and the form of presentation of the result, and a detailed scale of criteria will allow the teacher and project participants to evaluate the results of the work.

SECTION 2. EXPERIENCE OF USING THE LATEST FORMS AND TECHNOLOGIES OF TRAINING IN VOCATIONAL EDUCATION

Multimedia lecture

In training future publishing and printing professionals, the use of multimedia lectures is due to the peculiarities of the content of academic disciplines that require the inclusion of a significant amount of rather heterogeneous information: diagrams, graphs, technical drawings, photographs, video, animation, audio fragments and 3D objects [33].

For example, the discipline “Color Theory” becomes more interesting and understandable for students when the usual teacher's story is supplemented by a video demonstration of the processes of color synthesis or the functioning of color measuring devices such as a densitometer or spectrophotometer. And it is difficult to imagine teaching the course “Fundamentals of Composition and Design” without using a large number of images that demonstrate design solutions in the design of various printed products. The use of 3D objects will allow students to see objects and phenomena that are difficult to study in the normal educational process. In particular, 3D models allow you to get acquainted with the structure of devices from the outside and inside, to disassemble each element of equipment in detail, to learn its functional purpose and technical characteristics.

However, multimedia lectures will be successful in the educational process only if they are created and used in compliance with technical, psychological, pedagogical and ergonomic requirements and principles. Summarizing scientific approaches, we can identify a number of important principles that should be taken into account when preparing and delivering multimedia lectures [33].

The principle of science. The content of the lecture and all demonstrative material must meet a high scientific level. All judgments must be evidence-based and reasoned, and the educational information presented must be methodologically sound, concentrated, and clearly systematized. It is important to provide a sufficient number of facts, arguments, examples, texts or documents that support the main scientific points of the lecture (Figure 2).

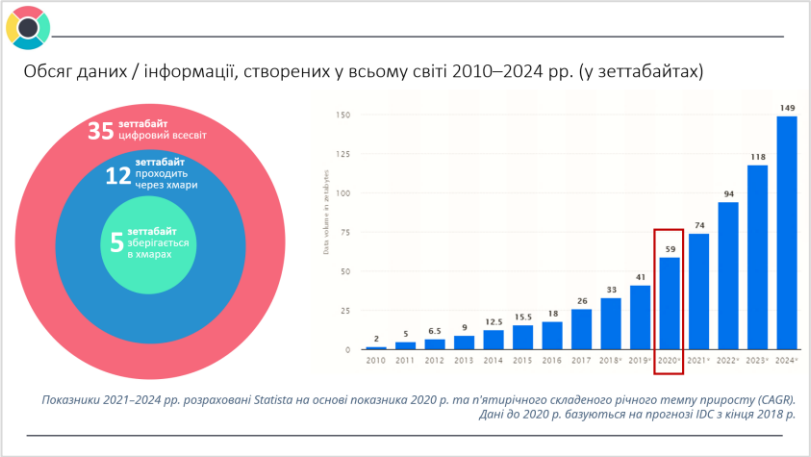

Figure 2. A fragment of the lecture

The principle of problematics. A multimedia lecture should contain elements of problematics. It is important to use such forms of visualization that would not only complement the teacher's verbal message, but would also be carriers of information themselves, because the more problematic the visual information, the higher the degree of student's mental activity. In a multimedia lecture, this principle is realized in different ways. For example, you can use problematic questions of a special design (What is the reason for...?, What is the difference between... and...?, What conditions are necessary for...?) accompanying specially prepared images. Another way is the “Expert Game”, when applicants are asked to play the role of an expert and analyze the proposed publications and identify the shortcomings, outline possible ways to overcome them. You can

also use tasks to identify mistakes and inaccuracies in the presentation, which are planned in advance by the teacher, tasks to establish similarities where differences are obvious and vice versa (for example, what is similar in completely different types of publications, or how the approaches to the design of one publication differ, etc.) (Figure 3).

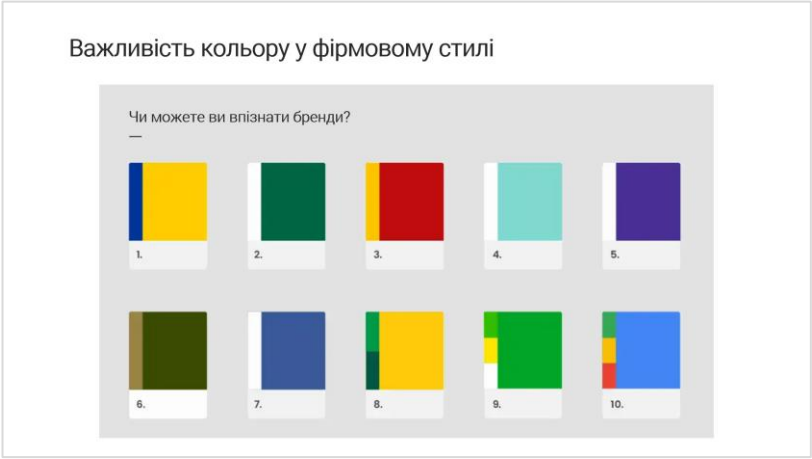

Figure 3. A fragment of the lecture

The principle of accessibility. The main purpose of a multimedia lecture is to overcome the difficulties that may arise when explaining complex theoretical concepts, conveying abstract concepts, processes and phenomena that are not accessible to observation. When explaining complex theoretical concepts, the most interesting facts, simple and vivid examples should be presented. Multimedia presentation makes it possible to make complex material clear and understandable. For example, an explanation of the principles of operation of certain equipment will be most understandable when the lecturer supplements the oral narrative with schematic images and a video demonstration of its application in practice (Figure 4).

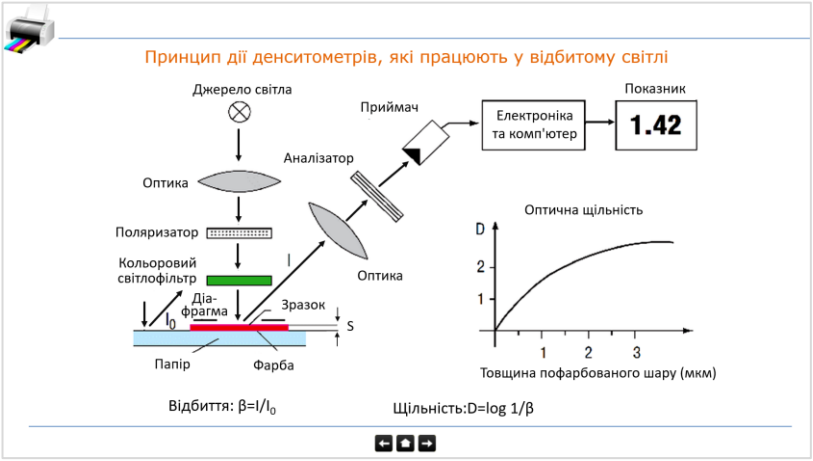

Figure 4. A fragment of the lecture

The principle of effectiveness. Another problem in developing a multimedia lecture is to involve students in the process of acquiring knowledge, as this requires the development of their thinking activity. There are various ways to realize effective student engagement in a multimedia lecture. For example, in order not to turn watching videos or animation into passive observation, it is advisable to organize this process in an educational and active form: before the screening, it is worthwhile to voice a list of questions to draw students' attention to important points, and after the screening - answers to questions; discussing what you have seen is effective; you can also use the “video case” technology.

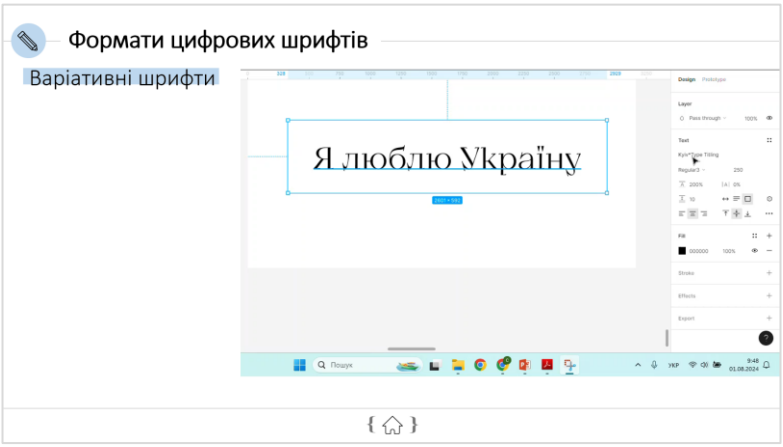

Figure 4. A fragment of the lecture

The principle of linking theory to practice. It is important not only to present the planned theoretical material, but also to emphasize its practical significance and demonstrate its necessity in future professional activities. In multimedia lectures, this principle can be realized by including video clips or illustrations in the presentation that would clearly demonstrate how the theoretical knowledge is used in real-life situations at enterprises, in the performance of common professional tasks (Figure 6).

Figure 6. A fragment of the lecture

The principle of achieving the logic of material development. This principle means that during a lecture session, educational material should be presented in a logical manner, gradually revealing certain provisions or describing processes and phenomena. The specifics of multimedia provide the teacher with various opportunities to implement this principle. In particular, during a lesson, it is possible to achieve a dynamic explanation of the educational material by sequentially unfolding or revealing individual fragments, resulting in the gradual formation of a construct (diagram, model, algorithm, panoramic photo, etc.).

The principle of cognitive interest. To draw the audience's attention to the programmatic educational material and interest students, you can start a multimedia lecture with a famous quote or statement by an authoritative figure in the relevant field, provide thematic illustrative material or video. When covering a particular topic, it is advisable to provide examples that are of interest to modern youth or that can be supplemented with interesting facts related to professional activities (Figure 7).

Figure 7. A fragment of the lecture

High scientific, theoretical and socio-cultural level of the lecture. The essence of this principle is that it is important to communicate not only

theoretical knowledge (theories, laws, patterns, concepts, etc.), but also socially regulated (plans, projects, programs, technologies, methods) and cultural and value information (ideas, ideals, beliefs, assessments, beliefs, motives, etc.). For example, when addressing the issues of the lesson, one should not give abstract examples, but rather choose those that will indirectly demonstrate to students the beauty and greatness of the Motherland, awaken love for the native language, encourage them to care for the earth, etc. Such an approach will help to form a harmonious, well-rounded personality.

The use of multimedia lectures in the professional training of future publishing and printing specialists is intended to become an effective way to improve the efficiency of learning. Thanks to multimedia technology, lecture classes become more intense and dynamic, and there is a possibility of multimedia presentation of educational material. However, it should be noted that the effectiveness of multimedia lectures in the educational process directly depends on the quality of preparation of educational materials and a reasonable approach to the organization of the university's educational environment.

Virtual lecture-excursion

In the process of professional training of future specialists in the publishing and printing industry, virtual tours have a powerful didactic potential and become a learning tool that opens up new opportunities [34].

This modern form of organizing the educational process allows you to demonstrate various aspects of their future profession to students in a visual, practical and interactive format. For example, virtual tours to production plants and printing houses can be organized to study technological processes and equipment, and virtual visits to publishing houses can be made to familiarize students with the specifics of publishing and prepress.

Of particular interest is the potential of virtual tours to develop visual and creative competencies, which are essential for successful work in this field. After all, publishing and printing is an industry where visual perception, creativity, and the ability to innovate play a crucial role. Virtual tours can help to increase the level of creative activity among future industry professionals, develop aesthetic taste and professional "insight", and visual thinking. They can be used in teaching various academic disciplines covering various aspects of publication design: from concept development, composition, typographic and color solutions to visual communication [38].

These can be virtual tours of museums and exhibitions, galleries, design studios and workshops, archives, installations, and art spaces. While "walking" there, students can not only examine the exhibits, but also visually confirm the theoretical knowledge they have gained and practically learn the material by completing various learning tasks. For example, they can analyze the color and font solutions in museum exhibits, investigate the compositional techniques used, and study expressive means. It is also a powerful tool for inspiring and developing visual culture, allowing you to effectively conduct design research, create mood boards, and develop design projects.

However, introducing a virtual tour into the educational process is a rather complex and painstaking process that can be divided into key stages: preparatory, design, and use, each of which includes sub-stages, depending on the educational content, didactic goals, audience, and technologies used [38].

For example, you can use ready-made virtual tours: Virtual tours of the Louvre (https://www.louvre.fr/en/online-tours#virtual-tours); Virtual museum of Dali (https://my.matterport.com/show/?m=K5MKrKcfyRW); virtual collections on the Google Arts & Culture online platform, etc.

The use of ready-made solutions in the educational process avoids the design stage, but requires careful methodological development. At the same time, one

of the problems is the difficulty of selecting a ready-made tour, all components of which would fully meet the didactic goal of the lesson. In this case, it is worth developing your own virtual tour, where each exhibit presented is selected to meet the planned learning outcomes. Today, thanks to modern technology, it is quite possible to realize this. As already mentioned, you can use 360° technology, 3D modeling or AR/VR technologies, or use the appropriate software. When creating virtual tours, it is quite productive to use professional online platforms that provide developers with tools and opportunities to implement their own virtual tours.

Let's look at a specific example of creating and using a virtual tour when studying the topic “Graphic Design Styles”. The purpose of the lesson is to develop students' systematic understanding of graphic design styles and skills in recognizing and applying them in the creation of print and electronic publications. One of the didactic tasks for which it was decided to use a virtual tour was to consolidate theoretical material and develop the ability of students to identify and analyze the characteristics of different graphic design styles and determine the suitability of the style for specific tasks. For this purpose, we did not use ready-made solutions, but created our own virtual tour with carefully selected exhibits.

For practical implementation, we used the online resource Artsteps, which provides a platform for creating, designing, and sharing your own VR exhibitions and stories (https://www.artsteps.com). The advantages of Artsteps are that the resource is quite clear and easy to use. It is accessible through a web browser after registration and does not require any additional software requirements. In addition, even using the free plan, you can implement quite interesting solutions.

The first step in creating a virtual tour was to select exhibits - works of art and design (various materials from posters to logos and web resources) that are vivid examples of certain styles. And then, on the Artsteps platform, we did the actual design: created our own 3D space, uploaded and placed our artifacts in the gallery halls, and determined the tour plan. Figure 8 shows the platform interface and the development process.

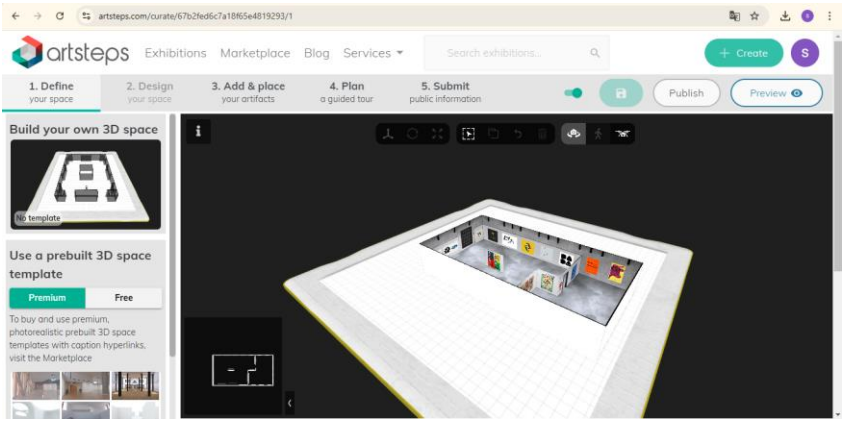

Figure 8. Creating a virtual tour in Artsteps

The created environment will be stored in your personal account, and it can be shared among a certain circle of users or made public. That's it, the virtual tour is ready for use. Figure 9 shows how one of the halls of the virtual tour looks like with the presented expositions. You can move around the halls in any direction, rotate, approach the exhibits, and zoom in on them with the mouse or keyboard.

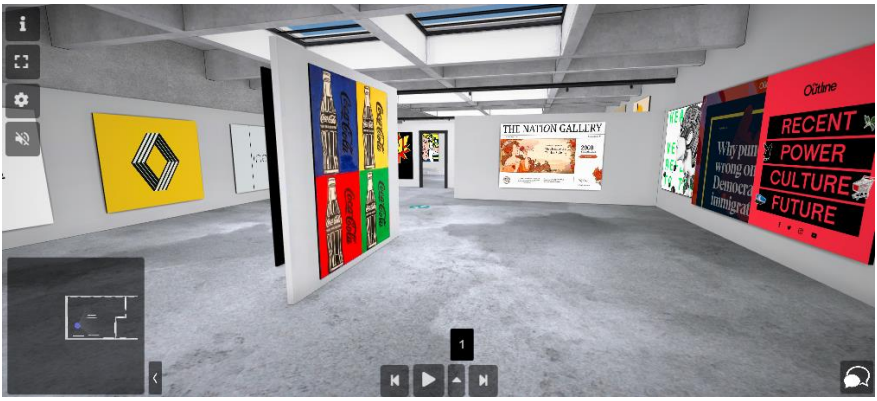

Figure 9. View of exhibits in the virtual tour hall

Depending on the methodological scenario of the lesson, a virtual tour can be used in two ways [38]. One way is when a teacher makes a demonstration during a class and acts as a guide, manages the process of viewing the tour, focuses students' attention on key aspects, analyzes examples, asks questions and encourages discussion. Another way is for students to learn independently, when they explore the tour individually or in small groups, complete tasks, analyze examples, and draw conclusions. In our case, we used the first method, which was easy to implement in online learning. The teacher turns on the screen demonstration and, in the role of a guide, conducts a tour along a predetermined route, asks questions and encourages students to discuss.

The format “guide-education seekers” is designed to stimulate the active participation of students, who not only repeated the theoretical material but also learned to recognize design styles in specific examples, arguing their choice and highlighting the characteristic features in compositional techniques, typography and color. The addition of modern logos and web resources to the tour, in addition to traditional posters, significantly expanded the context of studying

styles, promoted creative interpretation of symbolism and adaptation of design styles to different contexts.

Virtual lectures-excursions not only consolidate students' theoretical knowledge, activate visual analysis, creative thinking, and aesthetic taste, but also contribute to the development of their professional competencies through familiarization with the practical aspects of the industry and modern technologies.

E-portfolio

The technology of electronic portfolio has an extraordinary didactic potential in the professional training of future specialists in publishing and printing [37]. After all, students studying in this area master a significant number of disciplines, the main purpose of which is to form knowledge, skills and abilities in creating printed and electronic publications of various types, determining their color, typographic and compositional solutions, technical and artistic editing, etc.

During the course of their studies, students complete laboratory work, homework, and course projects, in which they develop book, newspaper, and magazine layouts, design logos, posters, and posters, create website templates, animation scripts, and 3D object models. As a result, a large number of works are accumulated, stored in different places in the department and by students, which are assessed in isolation from each other, without the possibility to track the progress of academic achievements, evaluate the efforts made, track the ability to work independently and effectively present their own work.

The technology of electronic portfolio allows to avoid these shortcomings. The ability of students to organize the work performed and the accumulated information, to show creativity in their organization and presentation will contribute to the formation of professional systemic thinking and professional

and communicative competencies, and to their conviction in the right choice of profession. After all, one of the mandatory activities of a specialist in this field is to create a portfolio of works and present it to the client.

However, the use of e-portfolios in the educational process is not a guarantee of achieving didactic goals. It is important to convey to students the essence of this technology, the specifics of the organization of learning and assessment of results. In the modern educational environment, it is appropriate to present methodological instructions for the design of a student's portfolio not in the form of an oral narrative or textual justification, but in electronic form, for example, using such information visualization tools as infographics.

During the semester of the course “Composition, Drawing, and Perspective,” students completed laboratory assignments aimed at mastering the laws of composition and perspective, mastering the ability to apply expressive elements of drawing, and developing creative imagination and fantasy. The end result of each laboratory was, among other things, images made on paper with any technical means (simple pencil, paint, ink, charcoal) or created in digital format.

It is important that all of these works are holistically structured and saved throughout the semester, giving students the opportunity to review the accumulated materials at the end of the study period, demonstrate them to the teacher, and visually present their progress and achievements in mastering the subject.

At the first lesson, students were provided with information about the peculiarities of organizing educational work using e-portfolio technology and presented with the electronic resource "Student Portfolio. Methodical instructions for implementation" (Figure 10) [37].

Figure 10. Home page of the electronic resource

The Student Portfolio electronic resource is designed in a restrained style with bright accents that highlight the main points. The title page contains information about the discipline, the teacher and presents sections with the possibility of going to them. The first section “Portfolio: Concept, Structure, Requirements” provides information on what a student's portfolio is, its structure, and the requirements for a portfolio. The material is presented concisely and clearly, using the possibilities of infographics (Figure 11).

Figure 11. Fragments of pages of the electronic resource

The following pages provide a schematic representation of the stages of the portfolio, taking into account the specifics of the discipline, and the requirements for the final result (Figure 12). All materials are presented in such a way that they can be covered at a glance and understood without further explanation.

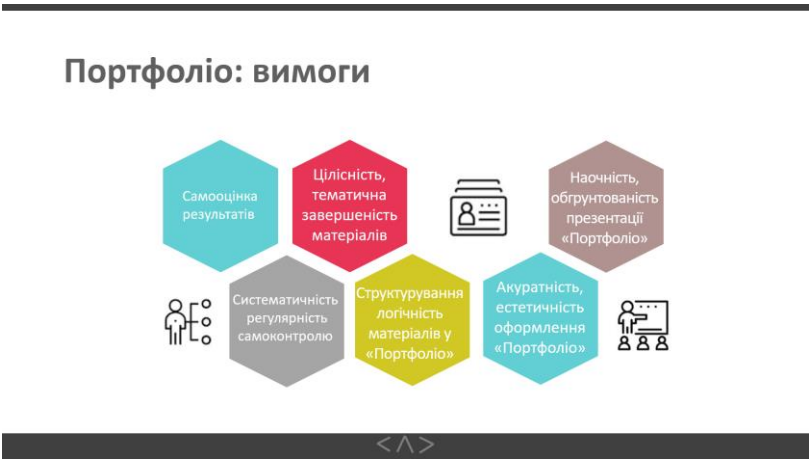

Figure 12. Fragments of pages of an electronic resource

In order to ensure the integrity of the resource, the second section presents tasks for laboratory classes and for self-study (Figure 13). Laboratory icons are interactive, and when you click on them, the files with the tasks are opened.

Figure 13. Fragments of pages of an electronic resource

The last section of the resource is “Assessment”. One of the advantages of portfolio technology is the ability of students to independently control the process of implementation and self-assess the final result. Therefore, it is

appropriate to provide clearly defined criteria by which both the teacher and the student will be able to objectively evaluate the created portfolios.

The use of e-portfolios and an electronic resource with guidelines for their creation in the process of professional training of future publishing and printing specialists confirms the didactic potential of this technology. Positive changes have affected the students' learning motivation, cognitive interest, desire to work independently, and the ability to critically evaluate their own work and the work of their classmates. The defense of an e-portfolio can simultaneously serve as a final assessment of academic achievement in the discipline, and the points obtained can be counted as a grade for a differentiated test.

Electronic portfolios posted on the department's website will enrich the educational environment, make it more personally oriented, and instill in students a sense of responsibility and importance of their own work. The use of e-portfolio technology will make the educational process interesting, open, and professionally oriented. Under certain conditions, a student portfolio can turn into a professional portfolio, with the accumulation of particularly successful developments that will be useful in further professional activities.

Case-study

The most widely covered in scientific sources is the use of case studies in the training of managers in economic universities, however, there is a tendency to use them not only in business education, but also in pedagogical, engineering, and subject-specific education. The issue of using case studies in the professional education of future publishing and printing professionals is still open.

The requirements for a specialist in the publishing and printing industry are a system of professional qualities that determine the success of the activity. The most important professional qualities of a publishing and printing specialist include the ability to produce extremely attractive publishing products using a wide range of tools and techniques. In practical work, he or she must solve creative problems and demonstrate artistic abilities by developing design solutions, using computer software to translate the idea into a publication layout, and, having chosen the right printing method and selected all the necessary parameters, bring the idea to life. In essence, this is a specialist who must demonstrate the integration of technical, information and design skills, be able to critically analyze large amounts of information, make informed decisions, work in a team, respond constructively to criticism, and promote the results of their work.

An interactive educational technology such as case-study technology will best contribute to the formation of skills for the future professional activity of printing students, since its distinctive feature is not the provision of ready-made knowledge to students, but the provision of conditions for their independent mastery. Experience confirms the effectiveness of this technology in the training of publishing and printing specialists, especially when students learn design disciplines, as it involves considering a significant number of situations or tasks in certain combinations based on real-life facts.

Let's consider the peculiarities of using case-study in the process of studying the discipline “Fundamentals of Technical Aesthetics and Design”. The organization of laboratory classes in the discipline will be more interesting, motivating and effective, focused on future professional activities, if students are given not just a task to create a design solution for a certain type of publication, but to solve situations close to real ones: interaction with the customer, teamwork, solving specific problems of printing design, finding and

eliminating errors in the design of publications, etc. For greater effectiveness, cases should be constructed in a way that does not present the problem in its pure form, but rather forces students to isolate it from the information contained in the description.

Of all the methods of case technology, case-situations and case-illustrations will be especially appropriate for teaching the Fundamentals of Technical Aesthetics and Design course. Case studies allow you to deeply and thoroughly explore a specific situation that may arise in your future professional activity (determining the graphic solution of a commissioned publication, distributing responsibilities, identifying ways to eliminate existing errors), develop a practical solution and implement it.

A case illustration is an illustration used to examine a problematic situation in order to analyze the essence of the problem, analyze possible solutions, and choose the best one. Case illustrations can be used to familiarize students with a real or fictional problem and to develop their own view of its solution.

By looking at illustrations (samples of publications, examples of cover design, layout methods, presentation of source data, typographic and color solutions), students discuss the information they receive, reason, make decisions, eliminate shortcomings, solve problems and implement their own solutions. And the method of situational analysis allows for a deep and detailed study of a specific situation that may arise in future professional activities (determining the graphic solution for a commissioned publication, distributing responsibilities, identifying ways to eliminate existing errors), developing a practical solution and implementing it.

For the use of educational technologies to be as effective as possible, it is important to convey to students their essence, the specifics of organizing learning with their use and evaluating the results. In the modern educational

environment, it is appropriate to present methodological instructions for solving cases not in the form of an oral narrative or textual justification, but in a multimedia form, using such means of visualizing information as video, photos, infographics [6]. Figure 14 shows the first page of the resource "Case-Study. Methodical instructions for performing laboratory work in the discipline “Fundamentals of Technical Aesthetics and Design”.

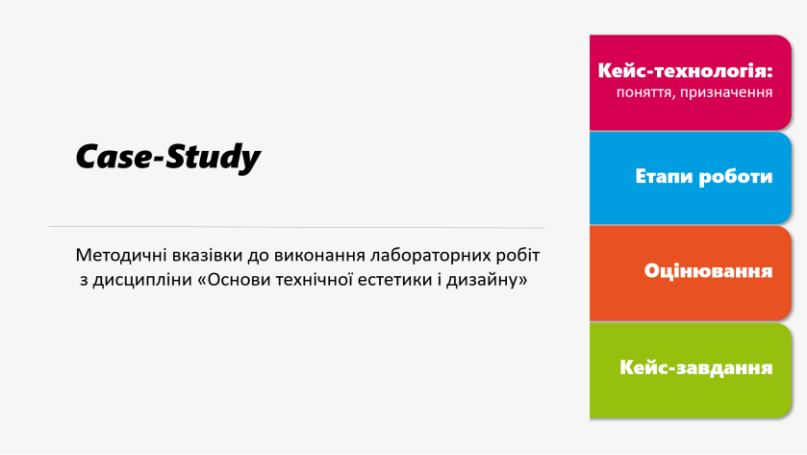

Figure 14. The first page of the resource

The non-standard design of the resource, which is strikingly different from the usual text documents, is designed to immediately interest students, capture their attention and motivate them to learn. The first page of the resource contains its title and interactive tabs with the ability to navigate to individual sections. This approach allows you to quickly navigate the material, not waste time searching, and immediately go to the right place. The color scheme, a light gray background and multi-colored tabs, make the resource attractive and easy to use: the main text material is easily perceived against a neutral background, and important points are clearly visible due to bright accentuation. This style is consistent throughout the resource, which gives it a coherent look.

It is important not only to get students interested in the original design, but also to make them understand the importance of using the new technology in their education and professional growth. To do this, you should briefly describe its essence and provide the purposes of its use. A structured presentation of the material, complemented by illustrations and icons, will make the text more readable (Figure 15).

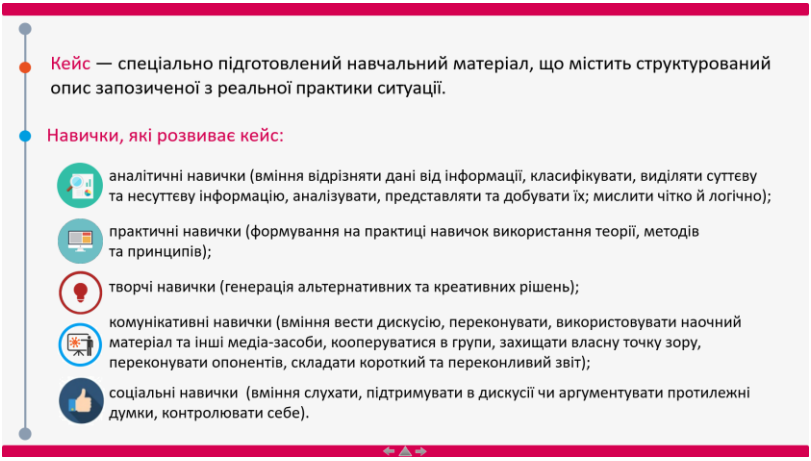

Figure 15. A resource page introducing a new learning technology

Figure 16 shows how the resource describes the stages of work on the case. For this purpose, we used infographics, which allowed us to present a long explanation of the material in a compact form, but in the most visual and understandable way.

Figure 16. Resource page with the stages of task execution

Infographics are also used to describe the parameters of performance assessment (Figure 17). Simplicity, absence of unnecessary details and specificity will immediately make students understand what the result of the work should be and what to pay attention to when completing the task.

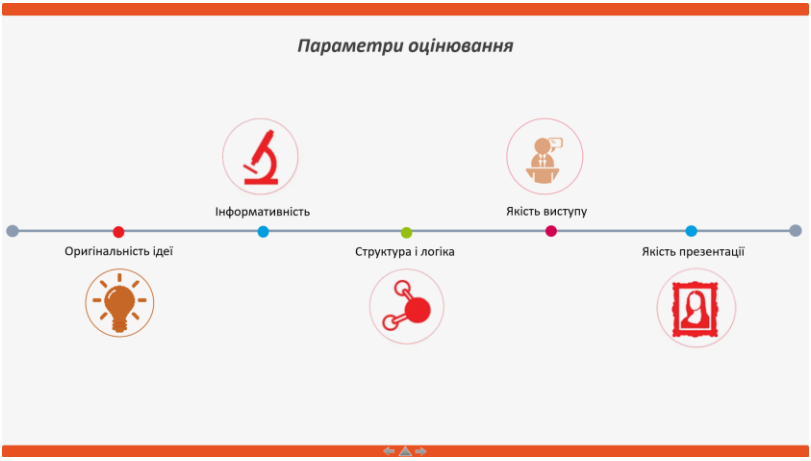

Figure 17. Resource page with assignment grading options

The case studies are placed on a separate page and are organized in the form of colored tabs with a number and topic. Clicking the tabs allows you to quickly navigate to the desired task (Figure 18).

Figure 18. Pages with interactive sections

Let's take a look at what the individual case studies are. Each assignment is a separate situation that has occurred or may occur in the professional activity of a publishing product designer. The subject matter of the tasks is closely related to the material studied in lectures and submitted for independent study in accordance with the curriculum of the discipline and takes into account interdisciplinary connections.

The peculiarity is that we have not developed a set of separate tasks, but rather created an imaginary design bureau “KMMT-art” as an entourage, which allegedly receives various orders from clients. This approach makes learning more realistic, connects it more closely to practice, and immerses students in their work. In addition, such “orders” have been prepared to promote not only the formation of students' professional qualities, but also the development of moral, patriotic, and universal values. For example, an order to develop a layout

for an animal shelter's advertisement or to create a design for souvenir packaging to create a visual identity for the country, or an order to produce a series of posters to promote reading. The inclusion of such tasks makes it virtually impossible for students to formally perform work “for the sake of a grade,” they feel a certain social responsibility, and it also combines the educational and educational work of the university.

The cases contain the information students need to complete the task: customer data, defined tasks, tools, and a description of the algorithm for working on the task. The material is presented in a concise, structured, and organized manner. Each case is a separate page, designed in a single graphic style with the ability to go to the task page, the previous and next pages, and the main page of the resource (Figure 19).

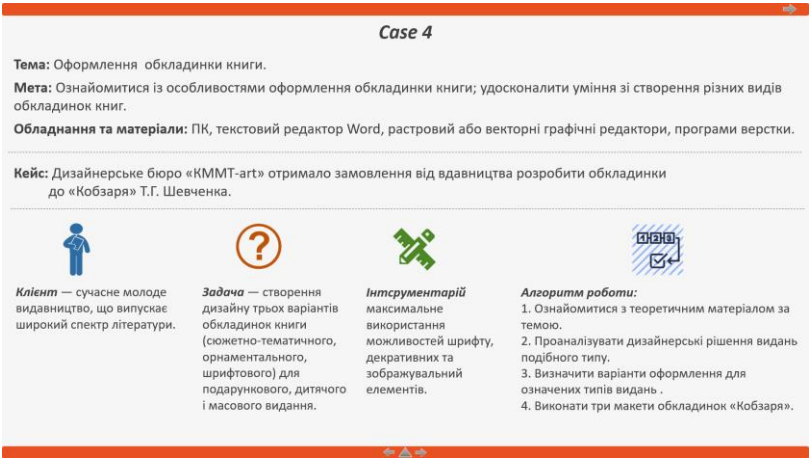

Figure 19. An example of a resource page with a description of a case study

The use of interactive educational technologies, in particular, case-study, in the process of professional training of bachelors of publishing and printing is an effective way to increase students' motivation and cognitive interest. Case study technology makes it possible to bring learning closer to future professional activities, to develop important competencies in students: the ability to analyze

tasks, generate creative solutions, work in a team, and justify their own concepts and ideas. The use of modern information and communication technologies for the development and implementation of case studies in the educational process makes learning more effective, as students will have unlimited access to educational material, and the use of high-quality and original teaching materials will significantly increase their didactic potential.

Game-based Learning

The use of business games in the professional training of future specialists is a powerful learning technology designed to shorten the stage of integration of young workers into the production process [22]. This technology is gaining wide popularity in business education, in the training of psychologists and teachers, in industrial and engineering education. It is equally promising, in particular, in the training of bachelors in publishing and printing.

Currently, the publishing and printing industry is a high-tech field of activity that requires qualified specialists who are able to ensure the organization of the technological process at all stages of creating printed and electronic products and are able to perform a variety of duties: type and edit text, process images, create designs and layouts of various publications, perform layout and prepress, work with animation, sound, and video. An HEI should provide for the training of a universal multitasking specialist who is able to adapt to performing various tasks in accordance with the changing needs of the market.

In addition, in the production system, employees of different positions and levels are forced to regularly make both simple and critical decisions, present their work, persuade and justify their own position in communication with other people (colleagues and clients). The use of business games in the training of bachelors in publishing and printing will help students quickly integrate into the

model of professional activity. They will be able to take on different functional roles, identify the specifics of their characters' activities, interact in a simulated, but as close to real, production process, and most importantly, see and evaluate the end result of their work. In addition, the business game will contribute to the development of communication competence and the personality of the future specialist.

Let us consider an illustrative example of employing a simulation game in the study of the academic discipline "Prepress Information Processing" [16]. The objective of this academic discipline is to elucidate the fundamental concepts of the prepress process, enabling students to master the methods, tools, technical specifications, and stages involved in the creation of various types of publications. Students are expected to acquire a comprehensive understanding of the theoretical underpinnings of layout, typesetting, and publication design, as well as the operational principles of workstations within computerized publishing systems. Furthermore, they should be proficient in designing and creating electronic prototypes of future publications using diverse software tools and in preparing them for printing using polygraphic equipment. In essence, the study of this discipline cultivates in students the knowledge, abilities, and skills that constitute the professional competence of a future specialist in the field of publishing and polygraphy. My own pedagogical experience has demonstrated that the integration of a business game can significantly contribute to the effective attainment of these outlined objectives.

During the initial, constructive stage, the primary activity was undertaken by the instructor. Throughout the first instructional module, students acquired theoretical knowledge and honed essential practical skills in a conventional format. However, the second module was specifically structured as a business simulation game. A segment of the future professional activities of a publishing and polygraphic specialist (the challenge of preparing and releasing a newspaper

publication) was modeled, tasks were formulated and their execution stages were described, and the roles of the performers were defined. Additionally, an original electronic educational resource was developed (Figure 20).

Figure 14. Main Page of the Resource

Within the developed resource, information regarding the specific procedures for conducting the sessions and completing the task is presented concisely and in a structured manner, utilizing original formatting, images, and infographics. This resource is interactive and comprises four sections: "Basic Concepts," "Implementation Stages," "Tasks," and "Evaluation." The interactive nature allows users to navigate to the desired section in any order. In the first section, students were introduced to the concept of a business game, its distinctions from a conventional lesson, and the potential benefits it offers for professional development.

The "Implementation Stages" section outlines the content of each work stage and the sequence of their execution (Figure 21). This enables students to organize and plan their activities, define a personal action plan, and adhere to it.

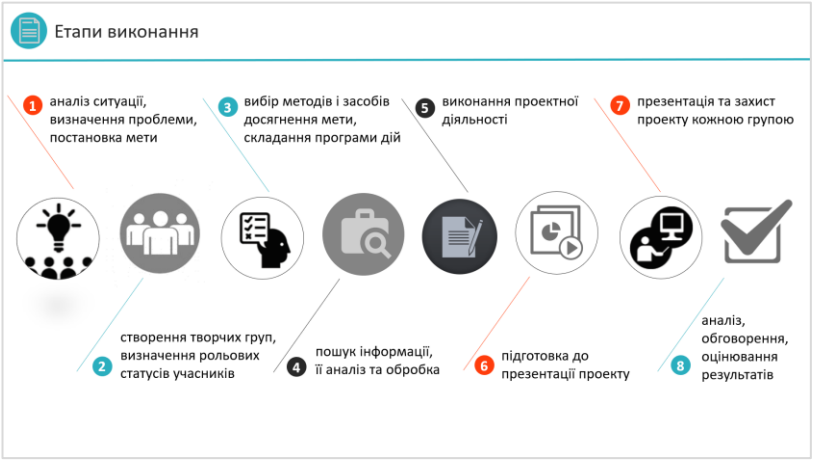

Figure 21. Implementation Stages Section

The "Tasks" section presents a formulated problem within an artificially created situation that models future professional activity and most fully reflects its essential aspects. The primary research task involves preparing a thematic issue of the department's newspaper (Figure 22). Students are invited to divide into three groups, choose a specific topic, and solve a series of professional problems analogous to those that will arise in their future professional practice. The final outcome for each group is a printed issue of the newspaper, which needs to be presented and defended.

Figure 22. Tasks Section

The instructor's role in the educational game is limited to its organization and coordination. After familiarizing students with the specifics, conditions, and rules, the instructor assumed a coordinating position, with all the primary work being entrusted to the students. The students were required to solve the assigned task collaboratively and independently. Initially, it was necessary to distribute the proposed roles: appointing a chief editor, journalist, literary editor, technical editor, designer, typographer, proofreader, and layout designer. Furthermore, a clear definition of the functional responsibilities of each participant, according to their chosen role, was required. At this stage, not only did the students' self-organization skills become apparent, but also their leadership qualities.

All work on the task execution had to adhere to the actual technological process of prepress preparation of publications. Students were provided with a sequence of operations, each of which, in turn, included a series of actions that needed to be performed (Figure 23).

Figure 23. Page with the provided stages of work on the task

Depending on their chosen role, each participant received specific tasks: selecting information on a given topic, processing it, editing textual and visual material, developing the concept of the future publication, determining the design solution, preparing the layout, and typesetting the publication. Thus, in the business game process, the student must perform actions similar to those that might occur in their professional activities.

The students worked in a well-organized team, collaboratively solving problems, discussing, and proposing various strategies and solutions. The work extended beyond the classroom during scheduled sessions into extracurricular time, with everyone striving to perform the task to the best of their ability and gain a certain status within the team. As there were three teams, the students not only cooperated within their own group but also competed with the others, which added a certain "excitement" to the process, compelling them to be active, effective, and to act for the benefit of the collective.

To solve the task, students needed to independently seek all necessary information and solution strategies, drawing upon the theoretical knowledge, abilities, and skills acquired during lectures and laboratory sessions.

Furthermore, the resource includes a section with supplementary materials that can be downloaded or accessed via links and utilized in the work process.

An important stage of learning activity is the evaluation of its outcomes. When conducting a business game, the objectivity of the game's results assessment plays a particularly crucial role. At the beginning of the game, students are familiarized with the evaluation criteria, allowing them to understand what aspects of their work to focus on and enabling them to critically assess their own achievements and those of their competitors.

The concluding stage of the business game involves the presentation and defense of the developed work. Each group of students presented their publication, justifying the concept, content, design solution, typographic and color оформлення, layout features, and other aspects. Figure 24 showcases the final results – the completed copies of the publications (special newspaper issues) prepared by the students.

Figure 24. Examples of projects completed by students

During the discussion, students had the opportunity to voice their comments or defend their personal stance, expressing their impressions of their own work

and the results of their competitors. Observing student activities and communication during the various stages of the business game revealed that this form of learning organization is engaging for them and allowed them to immerse themselves in a realistic work process.

Thus, the implementation of a business game proves to be an effective means of fostering the professional competencies of publishing and polygraphic specialists, directly orienting students towards the execution of the functions and responsibilities they will encounter in their future professional endeavors.

Quest Technology

Domestic and global practices affirm the effectiveness of utilizing WebQuests in the educational process of higher education institutions. My own pedagogical experience has demonstrated that this technology is also effective in the professional training of future specialists in publishing and polygraphy [6]. Let us consider an example of employing case study technology in the study of the academic discipline "Fundamentals of Typography." For this purpose, a multimedia educational resource with methodological guidelines for completion has been developed and implemented in the learning process. The aim of the WebQuest is to search for, select, analyze, and process samples of font and typographic design from various types of publishing products both online and in the real-world environment.

The competencies (general and professional) that a student should acquire as a result of studying the academic discipline using a WebQuest include: the ability to solve complex, unforeseen tasks and problems in the field of professional activity and/or learning, which involves the collection and interpretation of information (data), the selection of methods and tools, and the application of innovative approaches; the ability to communicate and articulate one's own ideas and design and development processes; the ability to evaluate

and discuss subjects related to publishing and polygraphy; mastery of basic skills in formulating and evaluating design concepts and models; understanding the theoretical fundamental principles of design in the specialization area of publishing and polygraphy; mastery of basic skills in formulating.

The creation of the WebQuest incorporated the following problem-based tasks: analysis (searching for and systematizing information), evaluation (providing a critical justification of the font and typographic solutions of the selected samples), and creative (developing one's own electronic resource).

The outcome of the WebQuest is a multimedia presentation. The final product should demonstrate not only the results of the students' research and exploratory work but also the level of their developed practical skills.

The developed WebQuest, although a mono-quest, possesses an interdisciplinary nature, as its completion requires students to utilize knowledge and skills acquired from studying other disciplines, particularly "Composition, Drawing, Perspective" (when creating the resource, the ability to thoughtfully execute the compositional organization of each page individually and the entire resource is necessary), and "Computer Graphics" (it is important not only to select material but also to properly prepare it in relevant graphic editors, adjusting tonal and color parameters, etc.).

За тривалістю проведення це довгостроковий квест (виконувався протягом місяця), оскільки перед студентами висувалося завдання не лише здійснити глибокий аналіз інформації, а й її перетворення і створення власного продукту.

Figure 25. shows the first page of the created multimedia resource.

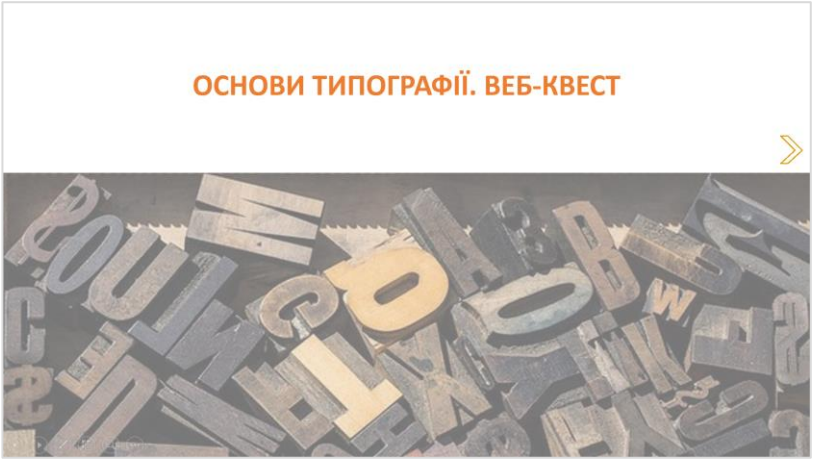

Figure 25. First page of the resource

The resource is simple and comprehensible, executed in a modern minimalist style, devoid of superfluous elements. Its navigation elements and interactive content ensure ease and convenience of use, allowing for swift transitions to the desired sections. All material is presented concisely and in a structured manner, without extensive textual explanations.

For enhanced comprehension, the resource content is visualized and presented in the form of infographics, facilitating easy "reading" and understanding, while also lending originality to the resource. The "Implementation Stages" section describes the overall sequence of the WebQuest, and the "Working on the Task" section details the steps for the direct execution of the assignment (Figure 26).

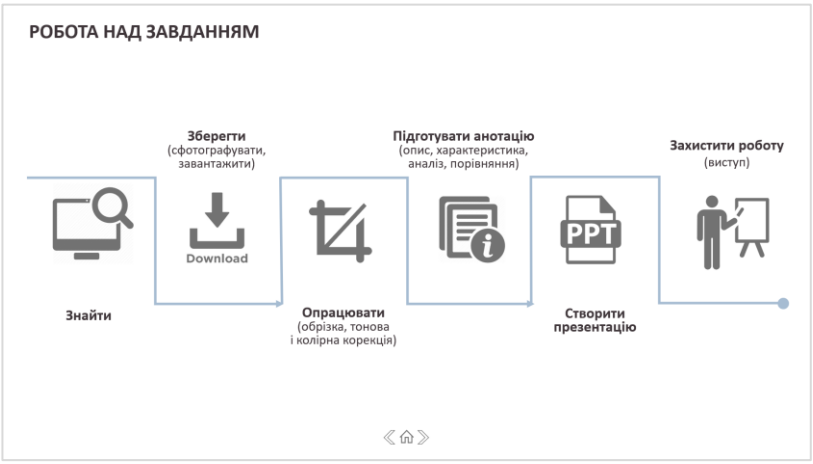

Figure 26. Page "Working on the Task"

The "Tasks" section provides a description of five assignments that students need to investigate (Figure 27). All assignments are directly related to the thematic plan of the academic discipline and are formulated not as a list of questions, but as rubrics. Alongside each assignment, a brief annotation is added to guide the search in the necessary directions.

Figure 27. "Tasks" page

As emphasized above, the "heart" of a WebQuest lies in its resources (links to Internet sources). The developed project also includes a "Resources" section, which provides a list of the primary sources that students can utilize to complete the assigned tasks (Figure 28). The presented resources are website addresses of the most important services and communities in the field of graphic design, where a large number of samples of printed and electronic products are collected. The entire list essentially comprises hyperlinks to the necessary web pages. Their value, within the context of this WebQuest, lies in the fact that they contain only examples of publications (without descriptions), compelling students to independently perform the analysis, comparison, and justification. Furthermore, these resources will become universally valuable for students in their further studies and future professional careers.

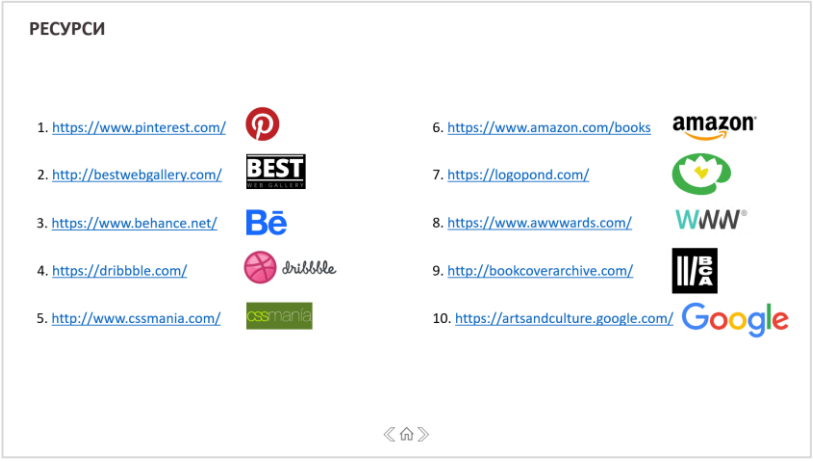

Figure 28. "Resources" page

The final element of the developed resource is the "Evaluation Criteria" section, which presents the levels and criteria for assessing the final outcome of students' work (Figure 29). The inclusion of this section will enable students to continuously exercise self-monitoring during their own work process and clearly envision the final result.

The created WebQuest was undertaken by second-year students majoring in "Publishing and Polygraphy" and served as a unique culmination of their study of the "Fundamentals of Typography" discipline. By completing it, students synthesized the theoretical knowledge and practical skills acquired during classroom sessions and also demonstrated an aptitude for research work by independently searching for and processing information. All work results were defended through the demonstration of their own developments, which not only allowed them to showcase their achievements but also to share experiences and discuss and debate contentious points. Figure 30 shows the students' work collected during the execution of the WebQuest.

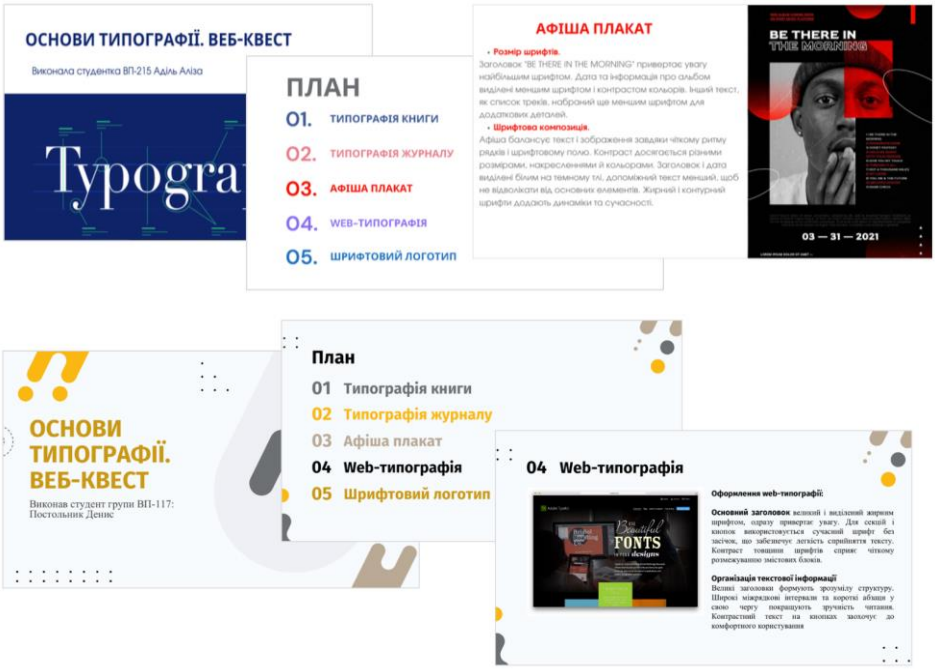

Figure 30. Students' works

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