

Innovative Approaches to the Organization of Distance Learning with the Use of Digital Technologies in Domestic and International Educational Practices

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Abstract- Distance learning using digital technologies has become a vital necessity in Ukraine in the context of pandemic and war. Such a transition took place in a short period of time and has now become a significant innovation in the educational space of Ukraine. Foreign experience in implementing distance learning has been analyzed, which allows taking into account the individual abilities, needs, temperament, and employment of students who have the opportunity to master the educational program in any sequence and pace, and interact with participants in the educational process through the use of distance learning platforms. The principles of open education are outlined (mobility of students and teachers; equal access to educational systems; ensuring quality education; structuring and implementation of educational services). The characteristics of blended learning models that are actively implemented in foreign and domestic educational institutions (Rotation Model, Flex Model, A La Carte Model, Enriched Virtual Model) are presented. The didactic capabilities of the main distance learning platforms (Moodle, Edmodo, iSpring, WebTutor, Google Classroom) are revealed. The interconnected structural elements of distance learning platforms in a blended learning environment are summarized and graphically presented. The features of the

practical application of distance learning platforms in blended learning at the Mykhailo Kotsiubynskyi Vinnytsia State Pedagogical University are analyzed according to its main components in the process of professional training of education seekers in the specialties 015.39 Professional Education (Digital Technologies), 011 Educational and Pedagogical Sciences, 073 Management. The results of a survey of education seekers and teachers are presented, in order to assess the effectiveness of the use of distance learning technology in studying educational material, organizing independent work, communication and interaction of all participants in the educational process. The main platforms for providing distance learning at the university are described and graphically presented, the main criteria for selecting distance learning sites by scientific and pedagogical workers, types of static data when working with distance platforms, types of activities of participants in the educational process using distance learning platforms, types of reproduction of the results of education seekers using distance learning platforms. The main aspects of the practical experience of implementing blended learning in professional training of specialists at the pedagogical university are summarized. The main directions of innovative approaches to the use and implementation of

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structural elements remote platforms in the conditions of blended learning in the process of professional training of specialists are determined, namely: access to educational content; interaction with the teacher; interaction between students; evaluation and feedback.

Keywords- blended learning, digital technologies, distance learning platforms, professional training of future teachers.

I. INTRODUCTION

The current education and science system is undergoing profound digital changes and needs to align with global trends in digital development to ensure the successful realization of every individual in a globalized society. The increasing speed of information flow and constant updating of information bring professional training of specialists closer to the conditions of high-tech production. Accordingly, improving the quality of their professional training, and upgrading qualifications without leaving the workplace in a short period of time with minimal costs requires the effective implementation of distance learning technologies in the professional training of 21st-century professionals.

The use of distance learning technologies has become particularly relevant in the context of the pandemic and the war in Ukraine. Under such conditions, the education system in Ukraine found itself in a fundamentally new situation when the entire educational process was transferred to a small format using distance technologies. Changes have occurred at all levels of the country's education system, as evidenced by the domestic experience. Educational institutions did not have a preparatory stage for such a massive transition to a distance format since teaching and learning in uncertain conditions was necessary. This transition took place in a short period of time and is now an essential innovation in the educational space of Ukraine.

It should be noted that in global practice, distance learning using digital technologies and electronic educational resources is an integral component of quality professional training. The world experience of implementing distance learning technologies can be characterized by the following directions: organizing distance learning in the Internet space; active implementation of mobile and cloud technologies in the educational process, the use of open educational platforms, and more.

In the process of utilizing distance learning technologies in educational institutions, the principles of open education are implemented, namely:

- The principle of mobility for learners and instructors - ensuring mobility for participants of the educational process, including international mobility.
- The principle of equal access to educational systems - providing equal opportunities for education within open systems for all individuals who have the desire and need to learn throughout their lives.
- The principle of providing quality education - ensuring that open systems deliver education of such quality

that meets the individual educational needs and societal demands for general and professional levels of preparation.

- The principle of structuring and implementing educational services - facilitating market mechanisms for the formation of qualitative and quantitative training, retraining, and upgrading of learners at different levels of education [1] – [3].

Taking these principles into account, distance learning technologies become an essential component of the educational process in educational institutions. The adaptability and modularity of distance learning elements allow participants in the educational process to implement a wide range of educational services according to chosen forms, methods, and types of learning.

II. MATERIALS AND METHODS

The purpose of the article is to provide theoretical justification and practical implementation of distance learning technologies in the process of professional training of specialists

In the context of our research, the classification of blended learning models proposed by online education researchers X. Steiker and M. Hori is important [4], [5]. This classification has found its implementation in both foreign and domestic educational institutions for professional training of specialists (tbl.1):

TABLE 1 BLENDED LEARNING MODELS AND CHARACTERISTICS

Blended Learning Models	Characteristics
Rotation Model	Based on the principle of cyclic change in learning location (rotation), where learners follow a specific schedule, moving from one form of instruction ("station") to another. One of these stations always involves online learning, while others may involve group work, project-based tasks, individual assignments with the teacher, and more.
Flex Model	Combines online learning with traditional classroom instruction, taking into account the learners' or instructor's potential to provide maximum flexibility in learning. Learners receive instruction in designated classrooms with assigned teachers and other consultants. Each learner has a personalized learning plan that includes group activities, project work, individual consultations, and more.
A La Carte Model	Relies entirely on online learning. In this model, the teacher serves as an online instructor. Learners may participate in the learning process either in a physical classroom or from home.
Enriched Virtual Model	Traditional classroom instruction is complemented with online elements. In this model, the traditional instruction ("lecturing" of materials) takes place through in-person classroom sessions, while learners engage in the remaining part of the course online. One instructor delivers both traditional and online instruction.

Implementing blended learning in vocational training involves learners acquiring a portion of the educational content through traditional instructional methods, while the remaining content is obtained using distance learning platforms.

Let's analyze the most common distance learning platforms used for organizing blended learning in educational institutions, taking into account the perspectives of both international and domestic practitioner instructors and researchers [7] – [8] (tbl.2).

TABLE 2 PLATFORM NAME AND CHARACTERISTICS

Platform name	Characteristics
Moodle	<p>Moodle is a free and open-source learning management system. It is installed on a server and supports over 100 languages and more than 1500 plugins. Moodle is suitable for educational institutions, training centers, and corporate training. It allows uploading presentations, images, videos, audio, and text files. Moodle can be customized to generate reports based on specific goals, such as analyzing learners' performance, tracking their study time, platform engagement, test errors, and more.</p> <p>Features of the Moodle platform:</p> <ul style="list-style-type: none"> • Configuration through plugins. The functionality and design of Moodle can be modified using plugins, which can be freely downloaded from the internet or created by users themselves; • Open-code system. Development can be done by anyone. Typically, users develop plugins and share them on the internet for general access; • Integration with other services. Moodle can be easily integrated with other platforms such as WordPress or webinar platforms like Zoom.
Edmodo	<p>Edmodo - a specialized web service that requires installation. Edmodo positions itself as a social network for learning or the "Facebook for education" - it functions based on the principles of social educational networks. The teacher creates a group (an online course) with a unique link and code, which need to be shared with other participants in the educational process. The group can have various educational elements such as posts (in the form of quizzes or files), tests, assignments, and surveys. Content from other services can be imported, such as news feeds from the educational institution's website, YouTube videos, or content from other services.</p> <p>Features of the Edmodo platform:</p> <ul style="list-style-type: none"> • Free to use. • Ad-free. • Simple registration process. • Users are divided into three groups: educators, learners, and parents (each group has its separate registration and access code).
iSpring	<p>iSpring - a platform oriented towards the corporate training sector. It allows users to start working immediately after registration. It supports various types of learning materials, webinars, detailed statistics, and a course editor that enables quick creation of courses and quizzes using office documents and videos. It includes the iSpring Learn learning portal and the iSpring Suite course builder. The platform is designed for the rapid launch of online learning. Presentations, images, videos, and audio files can also be uploaded to the platform.</p> <p>Features of the iSpring platform:</p> <ul style="list-style-type: none"> • Course builder: With this tool, users can create educational content such as courses, tests, interactive simulations, and screencasts. • Unlimited storage: Users can upload an unlimited number of files as there is no storage limit. • Integration with other services: iSpring Learn easily integrates with other client systems through an open API, for example, events and corporate portals. • Quick platform launch.
WebTutor	<p>WebTutor – an online learning system with modules for</p>

tor	<p>personnel management and evaluation that allows not only organizing training but also managing all HR processes: assessing the level of competency formation, automating recruitment and initial staff training, and so on. This complex system with extensive capabilities enables obtaining statistics on any data directions and presenting them in the form of graphs or tables.</p> <p>Features of the WebTutor platform:</p> <ul style="list-style-type: none"> • Configuration through modules. <p>WebTutor offers modules - separate programs with functionality (for example, distance learning modules, personnel selection, chatbots). In total, the platform has 12 modules.</p> <ul style="list-style-type: none"> • Integration with other systems. <p>WebTutor can be integrated with the client's IT infrastructure systems: 1C, Oracle EBS, SAP HR, and others.</p> <ul style="list-style-type: none"> • Course Builder. <p>WebSoft has the CourseLab course builder, which allows creating educational content.</p>
Google Classroom	<p>Google Classroom is an application designed specifically for education, available to all owners of a personal Google account.</p> <p>Features of the Google Classroom platform:</p> <ul style="list-style-type: none"> • Allows creating educational courses. • Enables sharing educational materials. • Facilitates the creation of assignments. • Provides the ability to assess knowledge acquisition and track the performance progress of each student. • Offers a wide range of tools for work, including videos, images, and simulators. • Ensures confidentiality and protection of personal information of participants in the educational process. • Can be accessed and used with educational content from mobile devices (smartphones, iPhones, tablets) based on Android and iOS. Developers provide extensions for Chrome and the ability to download apps from the Google Play Store and iTunes.

Generalization of the processed scientific literature allowed us to schematically represent the main elements of distance learning platforms that are capable of providing high-quality professional training for specialists (Fig. 1).

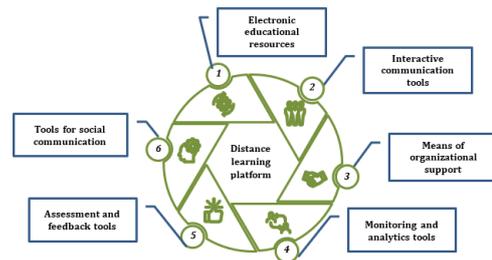


Fig. 1. Interrelated Structural Elements of Distance Learning Platforms in Blended Learning Environments

Let's characterize the interrelated elements of distance learning platforms in blended learning environments, as presented in Fig. 1:

- The distance learning platform is the central element that provides access to educational content, assignments, tests, and other resources, allowing interaction among all participants in the educational process.

- Electronic educational resources include e-textbooks, presentations, video lessons, audio recordings, and other materials that facilitate effective learning and independent study of the educational content.
- Interactive communication tools provide participants in the educational process with the ability to interact with each other through forums, chats, video conferences, and email.
- Organizational support tools include class schedules, course information, materials for self-study, and technical support for students and instructors.
- Monitoring and analytics tools display data on student activity, performance, and progress, enabling analysis of results and continuous improvement of the educational process.
- Assessment and feedback tools allow for electronic tests, assignments, and other forms of evaluation through the distance learning system.
- Social support tools provide feedback and support in particularly important life situations influenced by the conditions of uncertainty in Ukraine.

The identified elements of distance learning platforms contribute to the effective organization of the educational process and facilitate active interaction between instructors and learners during their professional training.

The question of using and implementing distance learning technologies and platforms in blended learning environments requires a thorough study. During our research, we employed theoretical methods such as analysis and synthesis of scientific sources, regulatory documents, theoretical literature, and electronic sources of information related to the issue of using and implementing distance learning technologies and platforms in professional training. We also utilized empirical methods, including observations and surveys. Additionally, we employed methods of mathematical data analysis.

The processing of the obtained data was carried out using software packages such as SPSS and Microsoft Excel.

The issue of implementing distance learning technologies in the context of blended learning was studied during the professional training of education seekers specializing in 015.39 Professional Education (Digital Technologies), 011 Educational and Pedagogical Sciences, and 073 Management. A survey was conducted to assess the utilization of distance learning technologies and platforms for quality professional training, including the study of educational materials, organization of independent work, communication, and interaction among all participants in the educational process.

During the study of the university-wide discipline "Computer-Oriented Learning Technologies" and the implementation of the project "Transformation of the Teacher Digital Competence Formation System: Innovative European Approaches" (Project: 101085799 - TSDigComp - ERASMUS-JMO-2022-HEI-TCH-RSCH, Grant Agreement No. 101085799 - TSDigComp), a survey was conducted among education seekers and academic

staff of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University regarding the use of distance learning technologies and platforms in professional training of specialists.

The survey was anonymous and covered 124 education seekers and 45 academic staff members. The survey questions addressed the organization and interaction of participants in the educational process in the context of utilizing distance learning technologies and platforms to ensure quality professional training in the face of uncertainty in Ukraine.

III. RESULTS AND DISCUSSIONS

In the process of professional training of specialists, the use of distance platforms in the conditions of blended learning can be represented by several variants of "blending":

- a combination of the eye form and the remote form;
- a combination of various formats of professional training in classroom conditions (main face-to-face training using distance learning technologies and various forms of working with electronic resources, online courses, etc.);
- a combination of independent study of educational content and work in the classroom;
- mixing the main educational content according to the traditional method (textbooks and educational materials) with external materials (electronic resources) [9], [10].

Currently, the most popular practice in Ukraine is the practice of combining face-to-face with remote.

The survey results show that the LMS Moodle platform (24%) is the most popular for organizing blended learning in higher education institutions, 22% use the Classroom platform, 2% use the iSpring Online platform, 1% use the LMS Edmodo platform, and the Meet 8 platform is used for communication %, own system using messengers 2%, Zoom platform 14% and Microsoft Teams 8% were used for video recording of educational content and its distribution for education seekers, 23% of respondents were composing platforms (Fig. 2).

When choosing platforms for the organization of blended learning, it is important to carefully consider the content of the educational component and the requirements for the competencies that the future specialist should possess in the process of studying it in accordance with the educational and professional training program for those seeking education. Under such conditions, the key point is to consider the educational content that the student can master independently with the help of electronic educational resources, and that requires constructive explanation within the classroom. The analysis of the questionnaire allowed us to identify the most common criteria for choosing distance learning platforms that

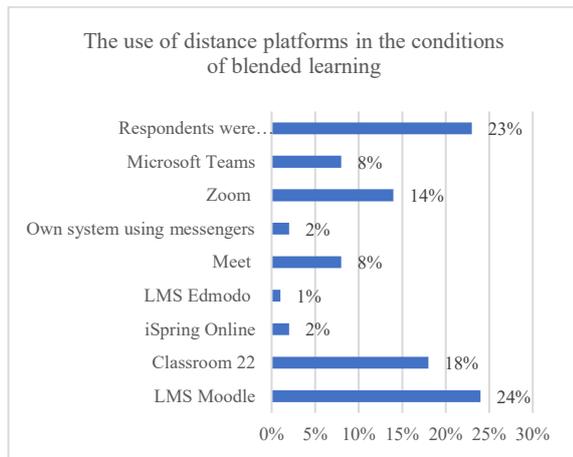


Fig. 2. Diagram showing the choice of distance learning platforms by scientific and pedagogical workers for the organization of professional training of specialists in conditions of blended learning.

correspond to the quality and effectiveness of blended learning, namely, 6% consider the registration of education seekers when working with a distance platform, 12% choose free access to learning within the distance platform, the breadth of coverage 10% of participants in the educational process pay attention, 18% choose the convenience of work and the system, 14% choose mobility, 12% choose the implementation of an individual approach when working with a remote platform, 10% pay attention to interactive interaction, 9% integrate online services, compose 2 or more criteria of 19% of participants in the educational process (Fig. 3).

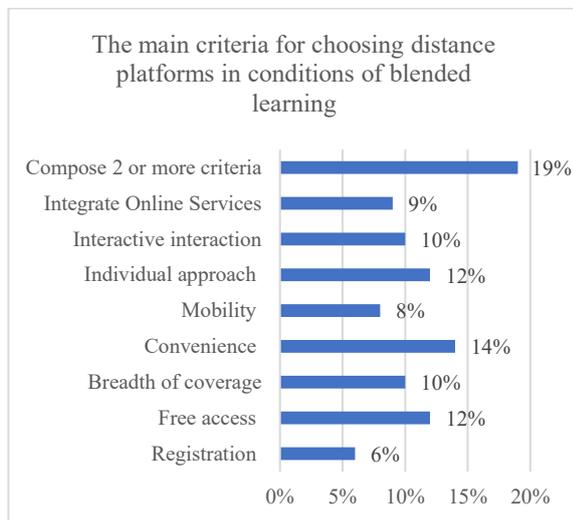


Fig. 3. Diagram showing the main criteria for the selection by scientific and pedagogical workers of remote platforms for the organization of professional training of specialists in the conditions of blended education

When working with distance learning platforms, it is important to prepare the educational content and adapt it to the goal of the educational discipline within the educational and professional training program for those seeking education. Increasing the information saturation of educational content is achieved by using visualization to

represent static and dynamic, real and abstract objects, holistic presentation of algorithms, processes, phenomena, reproduction of connections, etc.

As a result of the questionnaire, we determined that the visualization of materials for filling distance learning platforms in the conditions of blended learning are represented by the most common types of files: text 6%, hypertext 4%, images 7%, audio, video 12%, video 4%, tables 9%, program files, scripts 11%, archives 5%, combine 2 or more types of data 42% of respondents (Fig. 4).

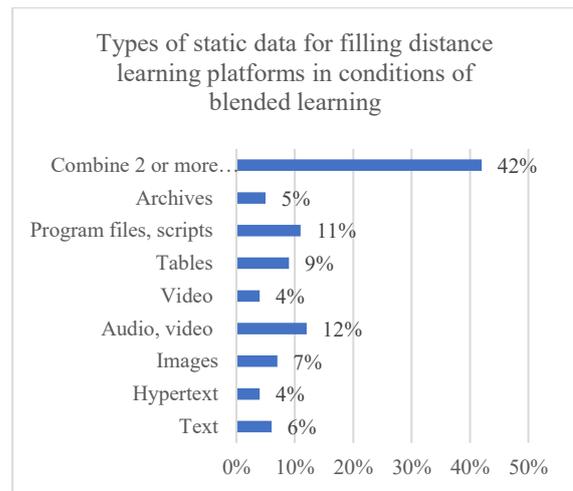


Fig. 4. Diagram showing the types of static data when working with distance learning platforms for the organization of professional training of specialists in the conditions of blended learning

The effectiveness of training using distance learning platforms depends on the interest and activity of all participants in the training process. The most common types of activity when working with distance learning platforms for students are tasks 15%, surveys 12%, chats 10%, video chats 7%, forums 8%, quizzes 12%, testing 10%, correspondence 4%, compose 2 and more types of activity by 22% of respondents (Fig. 5).

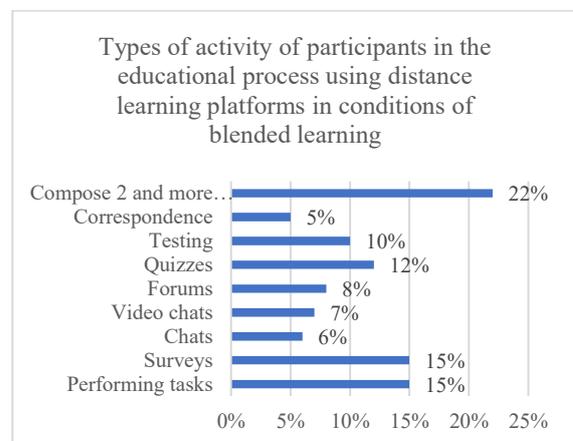


Fig. 5. Diagram showing the types of activity of participants in the educational process using distance learning platforms for the organization of professional training of specialists under the conditions of blended learning

The training process and its completion are accompanied by the automatic generation of data that reflects the intermediate and final results of professional training. The results can be presented in the form of a grade or points for completing tasks, the origin of tests, performance information, performance journals, report cards, electronic scorebooks, etc. The most common types of learning outcomes using distance platforms are grades and scores 15%, performance journals 12%, report cards 10%, scorebooks 7%, awards 8%, prizes 12%, statuses 10%, emoticons 5%, comments 4%, 17% of respondents compose 2 or more types of results evaluation (Fig. 6).

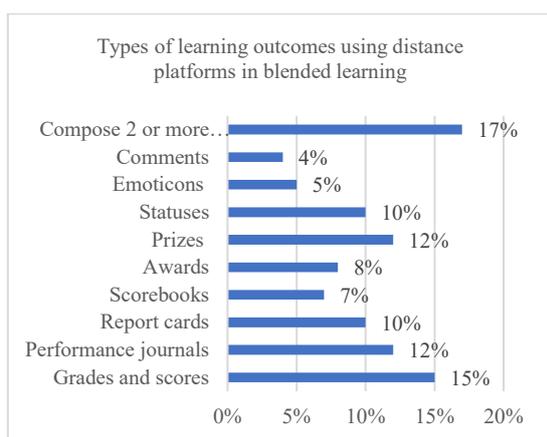


Fig. 6. Diagram showing the types of reproduction of the results of education seekers using distance learning platforms for the organization of professional training of specialists in conditions of blended learning

During the survey, the respondents noted the advantages of using and implementing structural elements and platforms of distance learning in the conditions of blended learning in the professional training of specialists, which provide:

- effectiveness - the level of achievement of goals and the quality indicator of educational activity - 22%;
- universality - possibility to use in any institution of higher education - 28%;
- optimality - organization of rational use of human, time, and technical resources - 18%;
- flexibility - the possibility of adjusting the training organization depending on specific conditions - 32%.

Regarding the shortcomings and problems of the use and implementation of structural elements and platforms of distance learning in conditions of blended learning in the professional training of specialists, the respondents singled out:

- student identification – 24%;
- establishing communication skills, working in a team – 36%;
- development of structural elements for filling distance learning platforms – 18%;
- composition of structural elements for filling distance learning platforms - 12%;
- centralized technical and methodological support in the process of using and implementing structural elements

and platforms of distance learning in conditions of blended learning in educational institutions - 10%.

Taking into account the analysis of the results of the survey and the results of the theoretical provisions of our research, we will single out innovative approaches to the use and implementation of structural elements and platforms of distance learning in conditions of blended learning in the professional training of specialists:

- Access to educational content: students can access e-textbooks, lecture notes, video lessons and other educational resources through the distance learning platform, which allows them to study the material at a time and pace convenient for them, self-study and self-development, adapt the educational process to their needs and opportunities.
- Interaction with the teacher: students can communicate with teachers using e-mail, forums or chats. They can ask questions, receive explanations and consultations, which contributes to effective learning, understanding of educational content and cooperation between teachers and students.
- Interaction between students: distance learning platforms provide opportunities for communication and collaboration between students. They can discuss learning topics, support group projects, and share experiences through forums, chats, or virtual groups.
- Assessment and feedback: students can take and pass various forms of assessment through the distance learning platform. Teachers can evaluate work, provide feedback, and assign grades, which facilitates objective assessment of student performance.

Under such conditions, we believe that our proposed innovative approaches to the use and implementation of structural elements and platforms of distance learning in conditions of blended learning in the professional training of specialists, on the one hand, contribute to the independent educational activity of the student, increase the level of their professional training, and on the other hand, encourage teacher to constantly search for effective technologies, forms and methods for quality organization of professional training of education seekers in accordance with the challenges of a globalized society.

IV. CONCLUSIONS

We analyzed the quality of the organization of the use and implementation of structural elements and platforms of distance learning in conditions of blended learning at the Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University according to its main components. Blended education in an educational institution is characterized by the following quality indicators: the content of education aimed at training qualified specialists; introduction of new innovative educational technologies into curricula, educational programs, methodical and organizational support.

We believe that under such conditions, distance education will not completely replace classical education, however, most likely, there will be a transition to blended

learning, in which digitalization of education will be manifested in various formats. In our opinion, there will be a transition from rigid standardization of the educational process to various forms of informal education, implementation of individual educational trajectories, network education. Rethinking the requirements for teachers, reassessing their status and the value of work, adapting educational programs to modern realities: full or partial online training, leading teachers from other educational institutions are invited; systematic support for the activities of teachers and students of higher education is carried out.

It should be noted that the transition to blended learning using structural elements and distance learning platforms helps the participants of the educational process to outline new opportunities and gain new positive experience. And this will certainly benefit institutions of higher education, because the software of various online educational platforms has been improved. Accumulated experience shows that remote technologies will become an integral part of modern educational programs. It is only necessary to find the optimal balance of traditional and distance learning formats.

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