Use of interactive electronic educational video resources for professional training of specialists

Uso de recursos de vídeos educativos electrónicos interactivos para la formación profesional de especialistas

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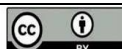
Abstract

The article proves the relevance and main tasks of using interactive electronic educational video resources for the professional training of specialists. The classification and features of interactive electronic educational video resources for the professional training of specialists are presented. The content and features of creating an educational video are disclosed, and their role in the training of specialists is disclosed, the advantages of using video in the educational process during distance education are shown. The significance of using interactive electronic educational video resources for preserving the continuity of education and the possibility of participants' communication in the educational process through platforms, e-mail, messengers (Telegram, Viber, etc.), video conferences, etc., is shown. The importance and advantages of mobile applications for the professional training of specialists with the aim of effective support and learning motivation in the educational process conditions have been proven. Recommendations are offered that can be useful for developing and using interactive electronic educational video resources from various disciplines. The analysis of the results of the conducted pedagogical experiment allows us to state that the use of interactive electronic educational video resources for the professional training of students in real life is indispensable in the modern educational process.

Keywords: interactive electronic educational video resources, professional training of specialists, video courses, video lessons, video classes, video lectures, multimedia technologies.

Resumen

El artículo demuestra la relevancia y las principales tareas del problema del uso de recursos de video educativos electrónicos interactivos para la formación profesional de especialistas. Se presenta la clasificación y características de los recursos de vídeos educativos electrónicos interactivos para la formación profesional de especialistas. Se divulgan el contenido y características de la creación de videos educativos y se revela su papel para la formación de especialistas, se muestran las ventajas del uso de videos en el proceso educativo durante la educación a distancia. La importancia del uso de recursos de video educativo electrónico interactivo para preservar la continuidad de la educación y la posibilidad de comunicación de los participantes del proceso educativo a través de plataformas, correo electrónico, mensajería (Telegram, Viber, etc.), videoconferencias, etc. se muestra. Se ha comprobado la importancia y ventajas de las aplicaciones móviles para la formación profesional de especialistas con el objetivo de apoyar y motivar eficazmente el aprendizaje en las condiciones del proceso educativo. Se ofrecen recomendaciones que pueden ser útiles para el desarrollo y uso de recursos de vídeos educativos electrónicos interactivos de diversas disciplinas. El análisis de los resultados del experimento pedagógico realizado nos permite afirmar que el uso de recursos de video educativos electrónicos interactivos para la formación profesional de especialistas ayuda a los estudiantes en la vida real y es necesario en el proceso educativo moderno.

Palabras clave: Recursos de vídeo educativos electrónicos interactivos, formación profesional de especialistas, cursos de vídeo, lecciones de vídeo, clases de vídeo, conferencias de vídeo, tecnologías multimedia.

Introduction

At the current stage of development of society and the educational sector, this is the choice of European norms and standards, joining the Bologna process, European integration. This requires a study of the methodology of continuing professional education as a multifaceted, interdisciplinary problem. Humanity is entering the era of the global world, the new modernity, where the interdependence and interrelationships of peoples, nations, and states are constantly expanding, a market economy, an informational planetary space is being formed intensively, the need for interactive continuous education during the life of every specialist, every member of society, is growing. Education reflects the socio-economic and cultural-

historical state of any country. Therefore, methodologically, there are no norms and ideals of forever set superhistorical standards in the process of professional training.

Under the requirements of the Bologna Convention, continuous human education should provide high-quality, innovative training of specialists for all educational and qualification levels. Modern interactive electronic educational video resources, which are necessary for the professional training of specialists, contribute to the improvement of the quality of innovative professional training.

The social order of society requires that the educational sector form people who know how to master and can creatively apply the basics of modern knowledge in practice, think, and have a high level of morality (Shetelya et al., 2023).

The use of interactive electronic educational video resources for the professional training of specialists, which can be used in cloud-oriented or traditional educational environments, is becoming increasingly important for the educational sector because, with the development of the latest technologies, it is becoming increasingly necessary to support students' interest in models of traditional learning or distance learning, mobile learning. The use of interactive electronic educational video resources for professional training of specialists (video courses, video lectures, individual video lessons, etc.) is the focus of attention of large corporations and companies and individual specialists and practitioners.

The use of interactive electronic educational environments and mass open online courses for professional training of specialists is relevant today: edX (edx.org) from Harvard University and the Massachusetts Institute of Technology, Coursera (coursera.org) from Stanford University, Lynda (lynda.com) from the company LinkedIn, Prometheus (Prometheus.org.ua) from several Ukrainian universities, which successfully combine video formats and text-graphic presentations of educational material.

A significant educational video resource is offered by YouTube video hosting. The rapid development of open electronic educational environments and new-generation educational resources has shown that non-textual and graphic tools (presentations with animated effects, structured hypertext electronic textbooks and manuals, interactive textbooks, testing systems, etc.) are a popular and effective component of the modern interactive educational environment. Video resources, the variety of which requires their creation and implementation, exchange of experience in the administration of works, development of the conceptual and categorical apparatus, as well as generalization in various forms of learning of the experience of using video resources (Hlynsky et al., 2017).

Given this, the problem of using interactive electronic educational video resources for the professional training of specialists in the study of various professional disciplines in the educational process is relevant and will be revealed in this article.

Literature Review

The problem of using interactive electronic educational video resources for the professional training of specialists is relevant and is being studied by scientists from different countries.

Scientists M. Baryshok, & D. Termenzhy (2021b), according to the ADDIE model of the theory of pedagogical design, described the author's experience in designing video lessons in mathematics, proposed the stages of creating educational materials: development, design, analysis, implementation, evaluation. The tasks that the developer must solve at each of these stages have been developed. The main formats for recording video lessons are proposed based on the analysis of existing developments. It has been established that distance learning has become an integral part of the educational process in the modern world because it allows students to study anywhere and at any time, which increases motivation to study.

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N. Anishchenko & A. Yevchuk (2020) are devoted to the problem of organization in education of methodical activity through the introduction of innovative educational technologies. The scientists substantiated various approaches to the definition of methodical work, showed the importance of using innovative forms of education in the educational field, and clarified their role in methodical work. The need for coordination in the education system, the development of educational institutions, and innovations in education have been proven; the existing problems of methodical work are analyzed, and ways of their solution by the teacher are proposed. Innovative approaches to the organization of methodical activity with pedagogical staff were analyzed and highlighted; the importance of the professional formation of a specialist was emphasized, and the prospects of transformation into service centers of methodical offices were considered to provide educational services to pedagogical workers; the influence of the teacher on his methodical activity is revealed. Under the conditions of modernization of education, promising trends in the development of methodical professional activity are shown. Using methodical work, in the conditions of the educational institution, the problem of improving the professional competence of teachers has been actualized.

The need to spread mobile learning in modern education, the importance of the use of information and communication technologies by students to increase the motivation to use mobile applications and improve their learning results in the process of teaching the disciplines of the humanities and natural sciences by A. Sustrietov, V. Ihnatiev, & I. Briukhovetska (2023) have been proven. It is noted that mobile devices allow students to improve the way they acquire skills and knowledge and thus establish the educational role of engaging mobile applications for additional information and synchronizing interaction between students of higher education, a direct impact on the way young people access information, the penetration of mobile applications and mobile devices in education. Mobile applications are described as tools used in distance learning to support learning and increase student motivation. The advantages that make the use of interactive electronic educational video resources for the professional training of specialists attractive are highlighted, and recommendations for the use of mobile applications are drawn up when teaching natural sciences and humanitarian disciplines.

The work of O. Gordiyenko & A. Shevkun (2021) in the conditions caused by the coronavirus disease pandemic is devoted to the problems of implementing mixed and remote forms of the educational process, analysis of teaching aids in higher education institutions using interactive technologies, and information and communication technologies. The research of scientists is focused on the study of the tools of the MS Teams platform and its main characteristics regarding the introduction of new interactive methods of teaching professional disciplines. A modern complex of methods, techniques, and means of teaching professional disciplines to students of higher education institutions has been developed. The results of the study contribute to the effective achievement of educational goals, make it possible to present educational material without significant quality loss using distance learning, maintain the interest of students, and provide an incentive for creativity in the educational process, which will be useful in the implementation of independent work of students.

Issues of theoretical development, substantiation, and introduction into the educational process of electronic educational video resources within the discipline "Informatics" for students of various specialties are dealt with by Y. Hlynsky, D. Fedasiuk, & V. Riazhska (2017) in the example of the analysis of the results of using a collection of video lessons and the development of projects in event-oriented programming. The scientists proposed the development of the existing conceptual and categorical apparatus, which relates to the development of electronic educational video resources within the discipline "Informatics". It has been proven that to increase the level of fundamentalization of learning in favor of independent work outside the classroom by students through the redistribution of study time, video lessons make it possible to automate the education process and ensure the release of classroom time to cover theoretical issues of the educational process. Practical recommendations for the creation of effective electronic educational video resources within the discipline "Informatics", which can be useful for students of various forms of education, are provided.

V. Bykov, O. Liashenko, S. Lytvynova, V. Luhovyi, Yu. Maliovanyi, O. Pinchuk, & O. Topuzov (2022) obtained a comprehensive analysis of the state of digitization of education and developed scientific and methodological support for higher education, identified current problems and identified the causes of their occurrence at all levels of digitalization of education, outlined the tasks and from a scientific point of view, ways of implementing digital transformation in the conditions of continuous innovative development of society, European integration of the educational sector are proposed in educational institutions. Effective methods and forms that promote interdisciplinary integration with digital technologies are given by Y. Karpenko & I. Golovko (2023): video classes, virtual laboratories, joint lectures, problem-based lectures, game technologies, and the use of the Moodle educational platform for distance learning.

So, as a result of the study of ways to use interactive electronic educational video resources for professional training of specialists, we note that the scientists obtained a comprehensive analysis of the state of digitization of education and developed scientific and methodological support for higher education; identified current problems and identified the causes of their occurrence at all levels of digitalization of education; identified effective methods and forms that promote interdisciplinary integration with the use of digital technologies; deal with the issues of theoretical development, substantiation, introduction into the educational process of electronic educational video resources for students of various specialties; substantiated various approaches to the definition of methodical work and showed the importance of using innovative forms of education in the educational field; described the author's experience in designing video lessons in mathematics, proposed the stages of creating educational materials; proposed the main formats for recording video classes; proved the need to spread mobile learning in modern education, showed the importance of using information and communication technologies by students in order to increase the motivation to use mobile applications and improve their learning results in the process of teaching professional disciplines; focused research on the study of the tools of the MS Teams platform and its main characteristics, regarding the introduction of new interactive methods of teaching professional disciplines, but did not specify the ways of using interactive electronic educational video resources for professional training of specialists.

Purpose of the research – to prove the necessity of using interactive electronic educational video resources for professional training of specialists when studying professional disciplines in the educational process.

Methodology

To realize the outlined goal, research methods were used: theoretical – analysis of psychological, philosophical, methodological, pedagogical sources, study of foreign and domestic pedagogical experience, methodological materials of higher education institutions, special literature on the problem of using interactive electronic educational video resources for professional training of specialists, application of multimedia systems in education; methods of comparative, retrospective, systematic analysis in order to determine the conceptual and categorical apparatus of research, to compare different views on the researched problem, to consider theoretical questions of research; system analysis during the substantiation of interactive electronic educational video resources for professional training of specialists; empirical – prognostic methods (generalization of independent characteristics, expert evaluations), observational methods (observation, self-observation, self-evaluation), diagnostic methods (surveys, conversations, questionnaires) to identify the level of readiness of future specialists to use interactive electronic educational video resources for their professional training, experimental (conducting an experiment) to determine and check the level of readiness of future specialists to use interactive electronic educational video resources for their professional training; methods of mathematical statistics – on the basis of establishing quantitative indicators of the assessment of the phenomenon under study for the analysis of the obtained results and confirmation of their probability.

During the experimental work, a survey was conducted in which 124 respondents took part: students and teachers aged 20-63 (teachers with an average teaching experience of 18 years). We conducted an online survey using the capabilities of the GoogleForms service and questionnaires in the audience.

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The analysis of the results of the conducted pedagogical experiment allows us to assert that the use of interactive electronic educational video resources for the professional training of specialists helps students in real life and is necessary in the modern educational process.

When further improving the system of using interactive electronic educational video resources for the professional training of specialists, we took into account the results of the questionnaire.

Results and Discussion

Relevance and main tasks of the problem of using interactive electronic educational video resources for professional training of specialists.

The challenges of modern society have proven the need to change the education system, which needs changes because outdated educational materials, teachers' unpreparedness to work in a digital environment, outdated teaching tools and methods of teaching students have led to many difficulties in organizing the learning process (Sulym et al., 2023).

Along with this, today's youth belong to Generation Z, which was formed and grew up in a digital environment. Students of the new information society are characterized by multitasking, that is, the ability to do several things at the same time. They perceive information differently, actively use 3D reality and virtual reality (VR), and prefer the multimedia format. Their language consists of audio podcasts, online broadcasts and IGTV, blog posts, text messages in messengers, discussions in various social communities, videos on YouTube channels, etc.

Therefore, the main task of a modern teacher in higher education is to "communicate" with such an innovative student in one language, involving him in a rich, more active, motivating educational process. It is in this case that video courses, video lessons, video lessons, video lectures, and multimedia technologies come to the teacher's aid. Until recently, video courses, video lessons, video classes, and video lectures were used in the educational process only as an auxiliary tool, for example, in cases when, under normal conditions, the educational material is difficult for students to perceive (Baryshok & Termenzhy, 2021a). In modern realities, video courses, video lessons, video lessons, and video lectures have become one of the means of asynchronous learning mode, which allows you to master the material, focus on your own understanding, and learn at your own pace and according to your own schedule.

The need to create an innovative interactive pedagogical system of the educational process appears among the main tasks of the educational industry for the purpose of qualitative use of interactive electronic educational video resources for the professional training of specialists and the purpose of personality development. A modern person must be creative, think productively, satisfy his own needs in self-discovery, be self-realized, creatively improve himself, and define himself personally and professionally. In solving this task, success is determined by professional skill, the general professional culture of the teacher, the acquired knowledge of the student, and his creative potential. Given this, the problem of using interactive electronic educational video resources for the professional training of specialists becomes relevant (Tretko et al., 2023).

Interactive electronic educational video resources for professional training of specialists are pedagogical innovations that are reflected in the content of education, methods, and forms of educational activity, arising as a result of creative searches for non-standard, original options for solving various problems in the regime of educational institutions, in the structure, management, and education control.

The use of interactive electronic educational video resources for the professional training of specialists contributes to increasing the level of staffing of teachers, their stimulation and innovative management of educational institutions, improving the professional skills of teachers, introducing modern technologies into

educational activities, innovative methodological activities through the use of effective, innovative forms, tools, methods, techniques.

In the context of the use of interactive electronic educational video resources in the training of specialists updating the content of education, priority is given to the following innovative forms of educational activity organization:

− Choose your own development trajectory;
− Taking into account educational requests and needs of future specialists;
− Encouraged everyone to acquire professional competencies
− To promote the student's ability to adapt to conditions that are constantly changing;
− To determine the motives of the professional development of an individual, the level of professionalism, options, and forms of a person's professional growth.

Classification of interactive electronic educational video resources for specialist training.

The results of creative searches in the professional training of specialists through the use of interactive electronic educational video resources can become educational technologies, new pedagogical innovations that should shape a person's worldview, contribute to the development of personality, increase culture, which is necessary in society for the success of every person (Anishchenko & Yevchuk, 2020).

According to the nature of the use of interactive electronic educational video resources, it is possible to divide them by purpose:

− ELectronic video resources for managerial purposes;
− Electronic educational video resources;
− Electronic video resources for scientific research (Tsarova et al., 2023).

In our opinion, the following important types of interactive electronic educational video resources should be considered for the professional training of specialists:

1) *Electronic didactic demonstration materials* – electronic data intended for the demonstration of objects, processes, visual and audio presentation of phenomena by providing the opportunity to observe them, which are studied to deepen their understanding;
2) *Electronic educational and methodical materials* – method recommendations, materials on teaching methods, instructions for coursework, laboratory, practical, etc.).

Interactive electronic educational video resources can also be classified according to the following criteria:

− According to the form of work in the lesson: individual, frontal, group
− According to the completeness of coverage of educational materials: not self-sufficient; self-sufficient (complete);
− By aggregation: elements; collections (homogeneous, homogeneous – homogeneous, heterogeneous –Heterogeneous.

Interactive electronic educational video resources for the professional training of specialists are classified by functionality (an inseparable connection is associated with the types of classes, which determines the duration of its playback):

− **Video course** – a set of electronic educational resources is a means of educational activity, which includes the presentation of data, with the principle and the predominant use of video data in various formats, containing a collection of video lectures and video lessons, which are a component of an

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electronic educational and methodological complex, reflect informational materials of a certain discipline or other open or closed educational electronic environment;

− **Video element** – short, 1–4 minutes long, video resource, which is an intro tool or a mini-video lesson, an advertising and familiarization tool, a fragment of some video resource, course annotation, etc.);

− **Video lecture** – a video resource designed to display the topic of an educational discipline with a duration of 20-80 minutes;

− **Video lesson** – the video resource is intended for the display of individual informational materials lasting 4-20 minutes within the framework of the topic of the educational discipline.

The average value of the specified time intervals should be considered the optimal value of the duration characteristics of the corresponding types of video resources.

According to the method of creation, interactive electronic educational video resources will be divided into three types during professional training of specialists:

− **Computer** – created using specialized software tools by capturing video from the monitor screen;

− **Real-life** – digitized and created by video recording (teacher-experiment, teacher-chalk-board, experiment-experiment-phenomenon-event, teacher-presentation-projector, etc.);

− **Combined** – created by combining previous approaches.

For successful assimilation of the material, interactive electronic educational video resources for professional training of specialists are divided into:

− Interactive electronic educational video resources for one-time viewing;

− Interactive electronic educational video resources for repeated viewing (if the subject of study is already familiar with the electronic educational video resource in frontal mode at the lecture, later views the interactive electronic educational video resource at home in mobile mode or turns to the interactive electronic educational video resources during laboratory classes for the third time, etc.) (Leleka et al., 2022).

Features of interactive electronic educational video resources.

The peculiarity of interactive electronic educational video resources is that in 7–12 minutes (within a limited period), they reveal topics that the lecturer, due to the insufficient amount of classroom time allocated to the course, cannot reveal by traditional means.

Interactive electronic educational video resources were used by us in various forms of training during the professional training of specialists. Initially, they were used in a multimedia lecture hall facing the front during a traditional lecture. Since the demonstration can be performed from a computer that is not connected to the network, the remoteness of the video broadcast from YouTube is not essential here. Due to the transfer of the presentation of pragmatic topics of the traditional lecture to the video mode and the change in the form of the presentation of the material, a pedagogical effect was achieved (Drozich et al., 2023).

The concentration coefficient will approximately be k = 3 when one such 10-minute film replaces a 30-minute oral message of the lecturer in terms of the volume of presentation of the material. Educational material was provided to students of distance education through the means of an open educational environment with the possibility of viewing video materials on YouTube. The developed video lesson can be considered, in this case, as an element of a distance course. However, the mobile form of education is associated with a significant number of video viewings, which we also practiced with students of the face-to-face form of education.

It became obvious due to the novelty of the material and the specificity that it is not enough to learn to create projects by watching a video once by one subject of training. The video lesson should be viewed 2-3 times to complete independent work on the proposed topic:

– At lectures – collectively;
– In Wi-Fi-equipped transport;
– Individually in the laboratory or at home, etc., using modern mobile devices: tablets, smartphones, and laptops (Hlynsky et al., 2017).

Conducted video lectures and created video resources by redistributing study time in favor of students' independent extracurricular work, making it possible to automate the educational process. For many higher education students, this meant taking classes in real-time (Google Meet, Zoom, etc.) via video chat platforms. A video came to the aid of both the student and the teacher.

What can be written in a 1,500-word article will attract more viewers and will allow you to explain the entire material in a one-minute video (Buchynska, 2015). Not all videos are equally useful and interesting for the listener. In the study "How video production affects student engagement: an empirical study of MOOC videos," Philip J. Guo, Juho Kim, & Rob Rubin (2014) measured engagement by how long college students watched the video and whether they attempted to answer the questions they received as a result video viewing, as a result of knowledge assessment, used data from 6.9 million video sessions on online courses concluded that video is important for online learning, but noted that some types of video work better and others less well. The researchers emphasized that:

– Short videos are more attractive than long ones (up to 15 minutes);
– A video in which a "talking head" is interspersed with slides is more attractive than a video containing only slides;
– More attractive for students are videos that can be used in the educational process where teachers speak enthusiastically and quickly enough.

The content and features of creating educational videos and their role for training specialists.

During innovative education, the following will be most appropriate for use:

1) **Screencasts, which can be accompanied by voice comments** – a digital recording of information that is constantly displayed on the computer screen. Computer screencasts are one of the main ones for working with various types of software when creating educational videos;
2) **Video with presenters** – is an electronic analog of a lecture, which students can watch at any time. In such videos, illustrative material is presented (presentation slides), and there is a speaker;
3) **How-to videos** – YouTube often has typical tutorial videos that are effective for product maintenance or assembly demonstration and quick to create;
4) **Explainer videos** – videos can be a hybrid of text annotations, animations, and live video, usually between 1 and 2 minutes long. There are different styles of video explainers designed to provide a direct, clear, well-written message that simplifies complex ideas into basic concepts, from videos with high visual saturation to simple animated images;
5) **Interactive videos** use short-term and professional video clips, including such elements as tests, images, text, etc., suitable for the formation of professional work skills, for monitoring one's learning;
6) **Demonstrations** – videos that contain a demonstration of laboratory work, experiments, software, and equipment operation, which can be created based on objective video shooting from photos of process stages (the process of creating a drawing, drawing, repair, assembly-disassembly, etc.).

You can also highlight the following educational videos: video scribing, studio video lectures, professional educational videos, 3D visualization, etc. These types of videos require appropriate knowledge and equipment, as they are more complex to create.

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To create a high-quality educational video for professional iterative training of specialists, you need to perform the following steps:

1) To make the video as useful as possible, it is necessary to determine the target audience;
2) To conduct a more rich and informative lecture, prepare a scenario by thinking over theses and tips, structuring the material;
3) Choose a camera and microphone with greater demands on sound and picture quality;
4) Choose a shooting location, think through the presenter's image, and set the lighting, remembering that the popularity of the video largely depends on the picture;
5) Before recording the video, you should choose the speaking pace and the optimal volume of the text and read the text aloud, the entire lecture can be divided in its entirety into short takes;
6) use the program for editing and creating educational videos.

To create a simple lesson video without complex special effects, you can use software that does not require special skills and knowledge. To keep the viewer's attention, creating an attractive video for students requires adding interactive quizzes or tests to the video lesson, which will allow the teacher to assess students' understanding of key concepts in real time (Shunkov et al., 2023).

The use of subtitles is another step that will make educational videos more useful, popular, and accessible to viewers who do not have or cannot listen to audio. Movement and graphics play a significant role in keeping the audience's attention. The use of motion graphics replaces text (Marrero-Sánchez & Vergara-Romero, 2023).

Let's name the advantages of using video in the educational process during distance education:

– The effect of presence (the student has the opportunity not only to read the text of the lecture but also to see his teacher);
– Easy integration with most learning management systems;
– Multiplicity and increased involvement of students in the educational process;
– Allows for humanizing the content of education;
– Students feel truly involved in the learning environment (Yatsenko & Yatsenko, 2022).

The use of interactive electronic educational video resources to preserve the continuity of education and the possibility of communication of the participants of the educational process through platforms, e-mail, messengers (Telegram, Viber, etc.), video conferences, forums, chats, etc. – through the means built into the education management system.

The choice by higher education institutions of the popular cloud service – the MS Teams platform from Microsoft Office – as a base for teaching in the quarantine conditions caused by the pandemic has shown itself as a comfortable and simple environment for students and teachers to use interactive electronic educational video resources for the professional training of specialists and the implementation and organization of educational tasks (Balalaieva et al., 2023).

The main components of the platform are video classes, teams, tasks, and forms.

Let's take a closer look at them and their capabilities.

Video lessons (Calling) in the MS Teams platform provide an opportunity to organize audio and video calls with each participant individually and with a group. The call can be scheduled as an instant or as an event in the calendar (Meeting), that is, participants are notified of an incoming call by the program, and the organizer switches to call mode immediately. The teacher can additionally use an interactive whiteboard for a visual demonstration of practical and theoretical material, represented by several applications (OneNote, Whiteboard, Freehand by InVision) (Knysh et al., 2023).

Teams (Teams) in the MS Teams platform allow users registered in the system to join groups to work on common tasks, projects, and files. Teams can be used by majors as groups of students in distance learning conditions. The following types of teams are provided for this purpose: staff, professional educational community (PEC), class, and others. As the owner of the team, the teacher can add co-owners and students, edit information about it, assign and correct tasks, manage events and video conferences, pin the team, and create additional thematic channels (hidden or public) in the "top".

Creating assignments (Assignments) in MS Teams provides support for discipline and motivation of students in the conditions of distance and mixed learning because the teacher sets deadlines, work evaluation criteria, plans tasks, assigns work to the team or individual members of it, and comments on each submitted work individually.

Forms are a component of the MS Teams platform designed for the creation and use of questionnaires, tests of various types, and surveys for quick information gathering. Forms have a fairly wide range of applications. The teacher creates and applies tests for ongoing verification of independent work, acquired abilities, knowledge, skills, and final and thematic control. Students can immediately receive the result, and the teacher can immediately receive statistical data on the success of the task because the evaluation process is almost completely automatic (Marusynets et al., 2022).

With the integration of the above-described interactive electronic educational interactive technologies of the MS Teams platform during the professional training of specialists, effective communication between the teacher and students is achieved at the highest possible level, and also the students of education acquire special and general competencies provided by the work program, which is necessary during the independent study of topics by students and during the lesson with the teacher (Gordiyenko & Shevkun, 2021).

Importance and advantages of mobile applications for professional training of specialists to effectively support and motivate learning in the conditions of the educational process.

The modern world requires more effective learning models that allow students to play a more active role in the learning process. Promoting innovation and creativity through the use of new ICT tools and training specialists in distance learning technologies is one of the priority areas of the strategic framework for education and training. Mobile applications for professional training of specialists are an effective means of supporting and motivating learning in the conditions of the educational process because they have advantages over traditional methods of learning (Lavrynenko, 2020).

Let's highlight the advantages of mobile applications for the professional training of specialists with the aim of effective support and motivation of learning in the conditions of the educational process
:
- Mobile applications can be used anytime and anywhere;
- Can be adjusted to the interests of the applicants, to individual needs, which helps to maintain interest in learning and their motivation for education;
- Mobile applications to feel confident and motivated for further achievements, allow students to track their progress in education;
- Game applications can be an effective way to make learning exciting and more interesting when used in the study of various disciplines;
- For learning, mobile applications with feedback can provide real-time feedback, help learners understand their strengths and weaknesses, enabling students to quickly improve their professional and digital skills;
- Mobile applications motivate to work together, develop communication and teamwork skills, and allow learners to work together on joint projects, even though mobile devices are part of the daily life of learners (Shuliak et al., 2022).

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We will single out the most effective mobile applications that can be used to motivate education, which are useful in teaching professional disciplines, and support learning in distance education conditions:

- PhET Interactive Simulations: to help the understanding of chemical processes, the application offers interactive simulations;
- Physics Sandbox: the application allows users to experiment with various physical phenomena;
- Khan Academy Physics: offers interactive tasks, video lessons, and other resources for studying physics;
- Simulations Plus: the application offers interactive simulations that help to understand physical processes;
- iNaturalist: using the phone's camera, the application allows users to identify animals, plants, and other objects of living nature;
- Khan Academy Biology: the application offers interactive tasks, video classes, and other resources for studying biology;
- Khan Academy Chemistry: the application offers interactive tasks, video classes, and other resources for studying chemistry;
- Chemistry 3D: the application allows users to study chemical structures and reactions in three-dimensional space;
- Khan Academy History: the application offers interactive tasks, video classes, and other resources for studying history;
- The History Channel App: The app offers history news, articles, and other history resources.
- Crash Course World History: offers video lessons about history in an accessible form.

These applications are used for various educational purposes – both for joint work and for individual study with other students: for completing tasks, consolidating knowledge, learning new material, preparing for tests or modular tests, etc. (Puhach et al., 2021). Since the power and capabilities of interactive electronic educational video resources are constantly growing, they occupy an important place in both face-to-face and distance education and can be more widely used as educational tools (Sustrietov et al., 2023).

Recommendations that can be useful for the development and use of interactive electronic educational video resources from various disciplines.

1. The development of interactive electronic educational video resources should begin with the creation of a short video lesson or video lesson using the oCam or Camtasia Studio programs. Computer video lessons and video classes, which are devoted to the technological aspects of technical disciplines, are the most useful and, in just 15 minutes, or even less – a limited period – reveal questions that the lecturer, by traditional means, cannot reveal due to insufficient the amount of classroom time.
2. One of the best programs for creating videos and screenshots is Camtasia Studio – a program that has an accessible and understandable interface. It needs 2 GB of RAM for comfortable operation. The cost of the program is 299 USD. The program makes it possible to create video materials of professional quality. You can save the recorded video in the following formats: SWF, AVI, FLV, WMV, MOV, and GIF. You can immediately export videos to YouTube and create videos for iPad and iPhone. Camtasia Studio uses its high-quality codec (TechSmith Screen Capture Codec (TSCC)) FOR video encoding. Camtasia Studio has a powerful built-in video editor with features that are not available in other specialized programs. For the development of high-quality interactive electronic educational video resources, the program is best suited to Camtasia Studio Developing interactive electronic educational video resources is a creative process that cannot be formalized.
3. We offer the development of stages of interactive electronic educational video resources (Hlynsky et al., 2017):

- Development of the script of the video resource (development of the plot and structuring and selection of materials: statement of the task, formulation of the goal and topic, the main presentation, recommended sources, used sources, conclusions);
- Preparation of the speech text;
- Preparation for video recording (preparation of slides, photos, scenery, scenery, working out plots, fragments of other videos, screensavers);
- Performance of trial recording of the video resource or its parts;
- If necessary, re-recording the video, editing the script (plot, text, other elements);
- Video editing, technical video editing (removing pauses, adding elements, working with sound, creating transitions, scaling images, footnotes, etc.);
- Critical analysis of sound accompaniment and replacement of the announcer, replacement of the soundtrack if necessary;
- Approbation of videos with professional training of specialists.

4. Focusing efforts on the scientific and methodical systematic support of digitalization of education as a whole system of digital transformation in terms of technical-technological, regulatory, psychosocial, didactic-procedural, personnel, managerial, and other aspects.
5. Intensification of the development of the educational segment of the world open scientific and educational information and digital space, its saturation with national electronic educational resources, computer-oriented means (digital educational platforms, digital educational content with augmented and virtual reality, mobile applications, electronic textbooks, management systems training, simulation, 3D models, etc.) to fully meet the needs of participants in the educational process in its implementation and effective design.
6. Ensuring targeted systematic development of digital competence of participants in the educational process: researchers, teachers of educational institutions, as well as students.
7. Introduction of a system of incentives for subjects of educational activity for effective use and creation by them of information systems, technologies, and digital means.
8. Implementation of certification of pedagogical workers, scientific-pedagogical, and scientific workers regarding their information and digital competence.
9. Improving the quality of professional training of specialists for effective professional activity in institutions of higher education and the digital educational environment.
10. Modernization of the content and methods of training specialists through the use of interactive electronic educational video resources, taking into account digital educational trends.
11. Expanding the construction of open pedagogical systems, applied and fundamental research of the problem of digital pedagogy, psychological aspects of interaction in the virtual learning environment of the subjects of the educational process.
12. Implementation of e-learning in formal, informal, non-formal education, etc.
13. Provision of psychological support and scientific and methodological support for the development of digital literacy for people of all age groups.
14. Implementation of measures to increase media literacy of the population, awareness of cyber security, information security, health protection of ICT users, countering threats of unauthorized use of personal data, protection of confidential information, etc. (Bykov et al., 2022).

The experiment

During the experimental work, a survey was conducted in which 124 respondents took part: students and teachers aged 20-63 (teachers with an average teaching experience of 18 years). We conducted an online survey using the capabilities of the GoogleForms service and questionnaires in the audience.

The purpose of the study is to prove the necessity and importance of using interactive electronic educational video resources for the professional training of specialists in the study of professional disciplines in the educational process.

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As a result of the conducted survey, it was established:

− 85% of respondents recommend using interactive electronic educational video resources for professional training of specialists;
− 80% of respondents believe that interactive electronic educational video resources for professional training of specialists increase motivation to study;
− 55% of respondents themselves use or used to use interactive electronic educational video resources during the educational process and professional activity;
− 94% of respondents (the vast majority of students) were interested in video lessons, and they wanted to use interactive electronic educational video resources constantly in the educational process.

Students attributed the following to the positive aspects of video lessons:

− 85% – novelty and modernity of providing new educational information;
− 74% – accessibility in obtaining the necessary information;
− 71% – attractive interface, convenience, and simple navigation system;
− 57% – motivating factor;
− 48% – visibility;
− 47% – an interesting explanation of difficult professional points.

However, 40% of respondents emphasized that it is worth breaking up long video lessons into several small videos (5-6 minutes each), that is, they suggested reducing their duration.
Respondents who took part in the survey noted (almost a third of students) that reference tasks should be more complex.

The analysis of the results of the conducted pedagogical experiment allows us to assert that the use of interactive electronic educational video resources for the professional training of specialists helps students in real life and is necessary for the modern educational process, namely:

− 94% of the surveyed respondents indicated an interest in using interactive electronic educational video resources during professional practice at the workplace;
− only 6% of respondents noted that important professional issues could be presented in traditional lectures;
− 88% of students of higher education noted that the use of interactive electronic educational video resources increased their interest in the future profession and significantly expanded their horizons;
− 94% of students would like teachers to use interactive electronic educational video resources for professional training of specialists in the educational process;
− 76% of students consider the most relevant use of interactive electronic educational video resources during distance learning.

When further improving the system of using interactive electronic educational video resources for the professional training of specialists, we took into account the results of the questionnaire.

Conclusions

We have proven the relevance and main tasks of the problem of using interactive electronic educational video resources for the professional training of specialists. The classification and features of interactive electronic educational video resources for the professional training of specialists are presented. The content and features of creating educational videos are disclosed, and their role in the training of specialists is revealed, the advantages of using videos in the educational process during distance education are shown.

The significance of the use of interactive electronic educational video resources to preserve the continuity of education and the possibility of communication of the participants of the educational process through platforms, e-mail, messengers (Telegram, Viber, etc.), video conferences, etc., is shown. The importance and advantages of mobile applications for the professional training of specialists with the aim of effective support and motivation of learning in the conditions of the educational process have been proven. Recommendations are offered that can be useful for the development and use of interactive electronic educational video resources from various disciplines.

During the experimental work, a survey was conducted in which 124 respondents took part: students and teachers aged 20-63 (teachers with an average teaching experience of 18 years). We conducted an online survey using the capabilities of the GoogleForms service and questionnaires in the audience.

The analysis of the results of the conducted pedagogical experiment allows us to assert that the use of interactive electronic educational video resources for the professional training of specialists helps students in real life and is necessary in the modern educational process.

When further improving the system of using interactive electronic educational video resources for the professional training of specialists, we took into account the results of the questionnaire.

Further research is needed to modernize the content and methods of training specialists through the use of interactive electronic educational video resources, taking into account digital educational trends.

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