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FINTECH EDUCATION IN THE DIGITAL ECONOMY: E-LEARNING APPROACHES

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Abstract. *High standards of education quality in today's world can be achieved by combining traditional teaching methods with elements of e-learning. The main goal of this article is to present the results of developing a blended course titled "FinTech in the Digital Economy", using innovative approaches, artificial intelligence, and the expertise of leading scholars to provide students with access to quality education – even during wartime. The study also aims to outline pathways for improving financial education through the integration of e-learning methods. Specifically, it demonstrates how the use of interactive platforms, multimedia resources, gamification, and artificial intelligence tools can enhance accessibility, learning effectiveness, and optimize instructors' workload.*

It has been established that the developed e-learning components allow students to study at their own pace and convenience. These components make the learning process more interactive, offering access to a wide range of educational resources and tools, while also creating a safer learning environment, especially under wartime conditions.

The study found that the core e-components of the course should include module topics and content, course description, learning objectives and outcomes, instructor information, two versions of the syllabus (official and informal), course terminology, learning materials, and final feedback. The course should be enriched with various gamification methods (glossary term selection, rewards, weekly quizzes, reflections, presentations of individual and group projects, etc.) to maintain high student motivation.

The research results demonstrate that developing e-learning components for academic courses opens opportunities for students to gain quality knowledge, develop analytical and critical thinking, and ensures continuous and safe access to education.

The practical significance lies in the fact that the proposed approach to creating a blended course can be adapted for other disciplines and educational programs, especially in unstable environments.

Keywords: *blended learning, e-learning components, FinTech, digital economy, gamification, artificial intelligence, safe educational environment, wartime.*

A problem statement and its relationship with problems of modern economic science and practice. Since February 2022, a full-scale war has been ongoing in Ukraine. This conflict

has posed significant challenges to higher education and raised an urgent need to ensure the proper quality of the educational process. The war has introduced new issues, such as frequent air raids and the threat of mass rocket attacks, becoming substantial obstacles to traditional education for a considerable number of students.

In the context of the wartime situation, many universities have adjusted the format of the educational process by implementing a blended learning model. Specifically, for the master programs the lectures are conducted remotely, while practical sessions taking place in classrooms according to the established schedule. These adaptations aim to ensure safety and the smooth functioning of the educational process in the conditions of a military conflict.

Designing online courses using artificial intelligence, self-assessment and peer reviews allowe educational staff to develop deep students' knowledge in a creative and engaging manner. Obtaining these valuable digital competencies is essential for improving education process at the universities.

Because of the COVID-19 pandemic and the russian-Ukrainian war, financial business entities are proactively adopting digital services and technologies for remote customer service. In this dynamic environment, educators and students should promptly adapt to the evolving landscape of the financial sector.

The term "fintech" combines the words "financial" and "technology" and points out to any technology that enables people and businesses to digitally access and manage their finances. Learning about fintech is crucial for job seekers in today's digital world due to its rapid growth, innovation, and the ongoing digital transformation of the financial industry. Fintech skills open up diverse job opportunities globally, ranging from software development to entrepreneurship. Understanding fintech also provides valuable insights into data analytics, regulatory compliance, and promotes adaptability in a dynamic job market.

In the conditions of war, it is impossible to have a clear schedule of classes for students. In such conditions, students must have the opportunity to receive quality education using distance learning methods. This can be achieved through the implementation of high-quality courses with using e-learning approaches.

Aimes. This article aims to develop electronic components for the academic course "Financial Technologies in the Digital Economy" (FinTech), focused on modernizing the educational process amid digital transformation and ongoing societal challenges. The core emphasis is placed on creating meaningful, methodological, and communicative elements of the course that ensure: acquisition of up-to-date knowledge in financial technologies; uninterrupted access to learning materials regardless of students' location; support for the educational process under martial law and in safe learning environments; enhancement of graduates' competitiveness in the labor market.

Achieving this aim involves solving a set of tasks, including: designing the syllabus, creating educational content, developing assessment systems, implementing tools for interaction among participants, and constructing structural elements of specific course modules.

Literature review. The development of electronic components for the course "Financial Technologies in the Digital Economy" was grounded in a comprehensive review of academic

literature and regulatory guidelines. In the article by Martin and Bolliger [11], asynchronous, synchronous, and bisynchronous formats of online learning were examined, and structural elements contributing to the achievement of learning objectives were identified. Based on the authors' recommendations, the Canvas method was utilized to organize all tasks required for the successful implementation of the course.

In the study by Kumar [8], five key dimensions of effective online courses were investigated, with particular attention paid to approaches to student assessment. A comparative analysis of digital learning platforms aimed at enhancing student motivation was presented by Aldalur, whose findings were taken into account when selecting technological tools and engagement strategies.

To ensure clarity, structure, and alignment with intended learning outcomes, the syllabus – serving as the students' initial point of contact with the course – was designed using principles articulated by Boye [4] and Harnish & Bridges [6]. Their recommendations were applied to establish a coherent and learner-centered framework.

Selected methodology. Different methods of scientific knowledge were used to create the FinTech course. The theoretical methods of scientific knowledge that were used for developing the course include: methods of analysis and synthesis, comparison and generalization, abstraction.

Empirical methods of scientific research were also employed, including:

1) study and generalization of pedagogical experience. Attending specific seminars and studying the material presented made it possible to identify problematic issues and contradictions, identify leading trends, original ideas, and introduce elements of innovation in the development of the course;
2) surveys and conversations. The survey of students and stakeholders about the relevance and expediency of studying academic disciplines contributed to the possibility of ensuring high quality of its teaching in modern conditions of martial law through the creation of an e-course;
3) testing and questionnaires. The testing method was used in the process of studying by students to identify the acquired knowledge. The final questionnaire is designed in the form of feedback, the possibility of improving the course in the future, taking into account shortcomings and comments.

Developing the course, was used the WWWWWH method ("Who", "What", "Where", "When", "Why", "How") [2]. It was based on the following sequential steps:

1) analysis of the situation. Ukraine is in a state of full-scale war. The war posed new challenges for higher education and ensuring the proper quality of the educational process;
2) examination of the main problem (impossibility of teachers to ensure a continuous educational process and students to obtain quality knowledge in war conditions) and defining the main tasks;
3) development of a relevant action plan for the further implementation of the project and the creation of an online course.

The method involves characterization according to the following criteria:

"Who" – definition of the target audience, i.e. people for whom this course is intended. Stakeholders include: students (acquiring knowledge and skills), teachers (offering quality educational products and participating in project development), stakeholders (acquiring professional specialists in this field). Students of the master's degree program "Banking Business and Financial Technologies" in accordance with the approved curriculum had the opportunity to study such a discipline.

"What" – explanation of the product or service. The design of the course "FinTech in Digital Economy" is extremely relevant in the field of finance in today's conditions. The course is developed on the Moodle platform. The primary advantage of the course is associated with the remote acquisition of knowledge through innovative instructional methods. This approach is designed to ensure continuity of education while safeguarding citizens under wartime conditions. "When" – clearly define the timeline. The course was implemented in the second semester of 2025.

"Where" – determination of the course implementation. The courset was developed on the Moodle platform. It was intended for a blended learning by master's students of the Faculty of Economics of the Ivan Franko National University.

"Why" – determination of the reason why it is necessary to implement a project on the designing course "FinTech in Digital Economy". The analysis of the current situation in the country showed the need for digital technologists in the financial sphere, as the processes of digitalization of the economy intensified in the context of the pandemic and the war in Ukraine.

"How" – development methodological framework for course was structured around the identification of key stages in project implementation, including the estimation of required material and human resources. The design of the course was developed using innovative technologies, including artificial intelligence, the latest distance learning tools and the leading experience of colleagues. The main resources for the course development were time and people, as well as accessibility to literary sources and the possibility of communication with specialists.

During the development of the FinTech course, the Regulations on the E-learning Course of Ivan Franko National University of Lviv [12] were adopted as a foundational standard. A structured framework for sequencing course development activities and ensuring compliance with institutional e-learning requirements was thereby established.

To inform the instructional design, international online programs were reviewed, including "FinTech: Shaping The Financial World" offered by the Massachusetts Institute of Technology and "FinTech Foundations and Overview" provided by The Hong Kong University of Science and Technology. These courses were examined to identify best practices in content delivery, integration of practical case studies, and the application of multimedia tools aimed at enhancing learner engagement.

Results. The result of the project is the development of the course "FinTech in Digital Economy" for blended learning. The aim of creating this course was to provide students with the opportunity to receive quality education in the conditions of war.

This course incorporates *modern methodological and pedagogical approaches*, utilizing information technology, artificial intelligence, and the expertise of leading educators and

professionals. It offers students the flexibility to engage in a blended learning format – participating in interactive lectures (live on the Microsoft Teams platform) and seminars in classes, conducting independent work with guidance provided in the online course. A comfortable and safe learning environment has been created for students, which will provide them with the opportunity to complete a high-quality course according to European quality standards of higher education under martial law.

In accordance with the requirements of the labor market, *course learning objectives and course learning outcomes* have been determined. The interconnection between course learning objectives, outcomes, and the evaluation methodology was outlined and presented on the Moodle platform. Consequently, students have a clear understanding of the anticipated learning outcomes and the associated assessment criteria.

The *structure of the e-component of the cours*e is included the elements presented on Figure 1. Each element is filled with information and materials that allow students to easily obtain the necessary and high-quality knowledge.

Course description contains information about educational course "FinTech in Digital Economy". This Master's level course covers the intersection of finance and technology in the rapidly evolving digital economy. It delves into the latest innovations, tools, and strategies in FinTech and equips students with the knowledge and skills needed to excel in this dynamic field.

This section defines the *course objectives and learning outcomes*, provides details about the instructo, offering a hyperlink to the teacher's personal webpage for a comprehensive overview of their biography, research interests, major achievements, and contact information. It also outlines the communication options available, both in class (according to the schedule) and outside of class (via email or leaving a message in the chat on the MS Teams platform). The chat for communication was directly created on the e-course using the Moodle platform. Additionally, the section encompasses the syllabus presented in an official format and a more warmly-toned version.
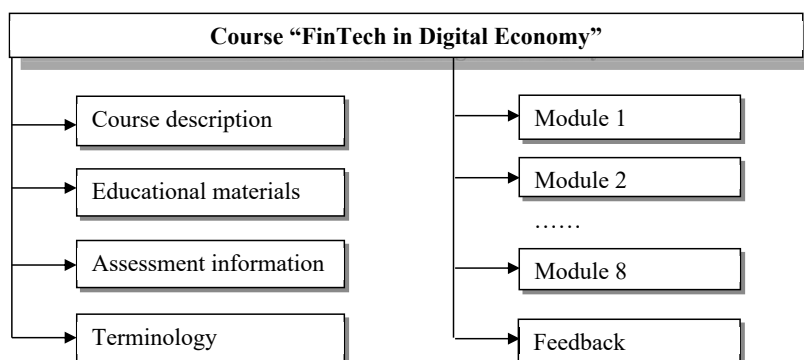

Figure 1. Elements of the e-course "FinTech in Digital Economy"

As part of the project outcomes, a curated *set of educational resources* was compiled to support student learning. These materials include direct links to websites of leading

fintech companies and professional associations, enabling quick access to relevant industry information. Additionally, theoretical and practical resources were selected to enhance the study of the course "FinTech in the Digital Economy", providing students with comprehensive support for mastering key concepts and applications.

As a result of the project, a *comprehensive framework for assessing student knowledge* was developed. It includes clearly defined evaluation methodology and criteria for both individual and group tasks. Students are provided with opportunities to submit their work through dedicated platforms and engage in peer review using structured assessment forms. Group discussions are facilitated via chat rooms, promoting collaboration and deeper understanding of project content.

To support terminology acquisition, a *specialized FinTech glossary* was created. This resource enhances students' ability to navigate industry-specific language, fostering more confident engagement with professional discourse and academic materials in the field of Financial Technology.

The course structure was organized into *eight thematic modules*, each containing topic outlines, learning objectives, and expected outcomes. These modules were developed using a combination of AI tools and expert insights, ensuring relevance and alignment with current industry trends. Each module presents key questions and learning goals to guide students through the content effectively.

To promote social interaction and reduce psychological stress, students are encouraged to participate in open discussions through a *dedicated Q&A section*. This space allows for additional clarification and peer support on course-related topics.

Finally, a *feedback mechanism* was implemented through a student survey designed to evaluate the course. The collected responses provide valuable insights for improving the quality and methodology of the educational program in future iterations.

One of the key outcomes of the conducted scientific and empirical research was the development of a *comprehensive syllabus for the course* "FinTech in the Digital Economy". The syllabus was designed based on a thorough review of professional literature and an analysis of contemporary teaching methodologies applied by leading educators in the field.

The syllabus was created in two formats to meet both institutional and student-centered needs (Table 1). The first version is an official academic document structured in accordance with the standards set by the Ministry of Education and Science of Ukraine. It includes detailed information about the course structure, assigned study hours, learning objectives, teaching philosophy, attendance policy, grading criteria, and recommended literature. Additionally, it contains a full list of topics, a course plan, and a calendar schedule of academic sessions.

The second version is a student-friendly adaptation, written in accessible language to facilitate understanding and engagement. This version presents the same core information in a simplified format, making it easier for students to navigate course expectations, learning resources, and evaluation procedures.

The dual-format approach ensures both regulatory compliance and pedagogical inclusivity, reflecting the research-based commitment to effective and student-oriented course design.

Table 1

Comparison of syllabus structure

Components of the syllabus according to the requirements of the Ministry of Education and Science of Ukraine	Syllabus in a warm tone for students
Name of the course	Information about responsible teacher
Course teaching address	Contact information
The faculty and department under which the discipline is established	Office hours
Field of knowledge, code and name of specialty	General characteristics of the educational course
Course teachers	Total hours
Contact information of teachers	Prerequisites
Course consultations are taking place	Course goals and objectives
Course page	Teaching philosophy and beliefs
Information about the course	Attendance
A brief summary of the course	Class participation
Aim and objectives of the course	Missed assignments
Literature for studying the discipline	Grading
Duration of the course	Learning resources for students
The scope of the course	
Expected learning outcomes	
Keywords	
Course format	
Topics	
Final control, form	
Prerequisites	
Teaching methods and techniques that will be used during the teaching of the course	
Necessary equipment	
Evaluation criteria (separately for each type of educational activity)	
Questions for a test or exam	
Final Survey	
Course outline	

The syllabus outlines the conceptual transition from the acquisition of knowledge and the acquisition of practical skills to the competencies that a student can acquire while studying a discipline. A well-designed syllabus allows students to understand what they will be able to learn, what exactly this training course is useful for them.

As a result of the conducted research, *the module content* was created using a combination of AI-based tools and up-to-date materials from recognized fintech experts, ensuring relevance and alignment with current industry practices.

The structure of the module includes clearly defined learning objectives and expected outcomes, a thematic presentation to support live online lectures, a discussion task designed to facilitate verbal interaction between students and instructors during practical sessions, a curated list of recommended literature, a formative test for knowledge assessment, and a question–answer section to encourage active engagement (Figure 2). Additionally, students are invited to reflect on their learning experience, fostering self-awareness and deeper understanding of the course material.
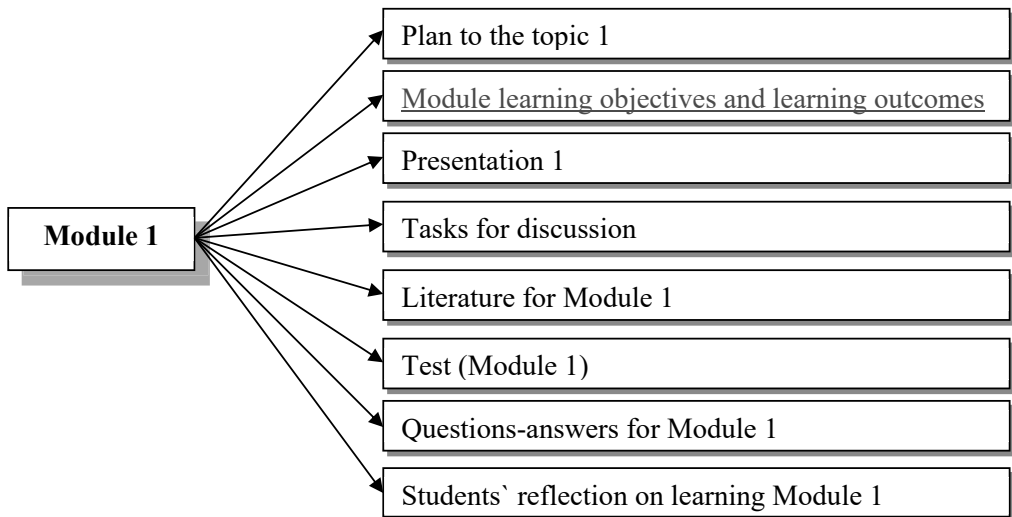
Figure 2. Structure of Module 1

All modules within the e-course follow a unified structure, which supports transparency of learning goals and consistency in instructional delivery. This approach enhances student preparedness and promotes meaningful participation in both theoretical and practical components of the course.

As part of the research, special tools were introduced to enhance student engagement. A forum was created for discussing course-related questions. Each module includes a quiz to assess knowledge and an optional reflection task, where students can share thoughts on the topic, format of instruction, or interesting insights.

After fulfilling all course requirements – submitting individual assignments, reviewing group projects, passing quizzes, writing reflections, and providing course feedback – students receive a badge as a reward for their active participation

As a result of the research, a *multifaceted system for evaluating student knowledge* was developed, combining traditional and innovative assessment methods. The system includes:

– verbal surveys, aimed at developing public speaking skills, argumentation, and the ability to analyze and compare facts;
– individual written assignments, which foster independent learning, practical application of knowledge, creativity, analytical thinking, and information literacy;
– group project development, encouraging teamwork, responsibility sharing, and public presentation skills. This format also supports students' psychological resilience and adaptability – particularly relevant in the context of societal challenges such as the ongoing war in Ukraine. Collaborative learning and flexible online participation help reduce stress and promote meaningful peer interaction;
– Self-assessment, which cultivates critical thinking and the ability to evaluate both personal and peer contributions;

– weekly module quizzes, designed to assess theoretical knowledge through varied question formats, including open-ended responses, glossary-based definitions, multiple-choice tasks, sequencing, and concept mapping. These quizzes help students consolidate learning and confirm the acquisition of key competencies.

This integrated evaluation system supports both academic achievement and personal development, aligning with the demands of a dynamic educational and social environment.

Conclusions and future improvements. Following the recommendations of Martin F., Bolliger D. U. [11], the survey of students regarding the consideration of their preferences for better material assimilation was conducted. Students emphasized the usefulness of group projects, the importance of developing criteria for mutual assessment in the form of a table with evaluation rubrics. Additionally, the majority of surveyed students expressed a preference for quizzes conducted immediately after studying each topic.

In the development of the course "FinTech in the Digital Economy", the core criteria of a high-quality online course, as outlined by Kumar [8], were adhered to. Authentic learning materials were incorporated, closely aligned with practical applications to support students in preparing for future professional activities. The instructional process was enhanced through the review of online conferences on financial technologies and the inclusion of guest lectures delivered by industry practitioners.

Modern multimedia tools – including MS Teams, PowerPoint presentations, internet-based resources, presentation templates, and the Moodle platform – were employed to deliver lecture content and module materials. The completion of individual and group projects was structured to require the development of PowerPoint presentations summarizing project outcomes.

Student reflections were encouraged as part of the learning process, enabling the monitoring of academic progress and fostering active engagement. A general overview of the course was provided, accompanied by detailed instructions for completing various tasks, utilizing the glossary, and navigating course components. A brief introductions to modules ware also included. All elements of the course were comprehensively described in the developed syllabus.

In the technical formatting of the course, the recommendations of Baldwin [3, p. 420] were followed, particularly those concerning the minimization of clicks required to access essential content and complete the educational tasks outlined in each module. Clear navigation was implemented to simplify menu selection, and hyperlinks were provided to facilitate access to instructor information, educational materials, recommended resources for course mastery, and the syllabus. To enhance the usability and accessibility of the course, future improvements will focus on strengthening technical support and optimizing the user interface. Continuous access to support services will be maintained to assist students whenever needed. In line with existing research, it is anticipated that minimizing scrolling will further improve the effectiveness of the online learning environment.

To enhance student motivation in the learning process, the recommendations of Aldalur [1, p. 86] regarding the integration of gamification elements were followed. Platforms such as Kahoot, Moodle, and Google Forms were utilized to support interactive engagement and formative assessment. Preference was given to Moodle, as it is freely available, integrated

with the university's academic infrastructure, and enables unrestricted access to course materials and task solutions. Additionally, its functionality allows for the incorporation of mathematical symbols and formulas.

In accordance with the recommendations of Boye [4], the syllabus was structured to include clearly defined elements that contribute to its effectiveness. Key components were incorporated, such as basic information about the course and instructor, educational materials, the course schedule, and the expected learning outcomes.

Comprehensive instructor details were provided, including personal phone number, email address, and designated office hours for communication outside of class. As emphasized by Boye, such transparency benefits both instructors and students by fostering accessibility and academic support.

The recommendations of Harnish and Bridges [6] served as the foundation for constructing the syllabus in a friendly and approachable tone. It has been demonstrated that such a tone positively influences students' perceptions of both the instructor and the course. Accordingly, it will be recommended to colleagues that syllabi for other courses be developed using a similarly student-centered tone, as this approach may contribute to increased student interest and enrollment in the master's program over time.

As part of the planned improvements to the course, particular attention will be devoted to the integration of multimedia resources. For each lecture, short video recordings accompanied by lecturer annotations will be developed. These materials are intended to provide students with a concise preview of the lecture content, emphasizing its relevance, applicability, and anticipated learning benefits.

Furthermore, the course will be supplemented with video interviews featuring recognized experts in the field of financial technologies. The inclusion of authentic materials has been shown to positively influence student attitudes, reduce anxiety [5], and enhance motivation to learn [7]. These resources will be incorporated to foster deeper engagement and promote a contextual understanding of contemporary fintech developments.

Given the innovative nature of the course, the systematic collection of student feedback will be regarded as a critical component of its ongoing refinement. Although preliminary consultations with students were conducted during the design phase – particularly concerning course content and assessment formats – it is acknowledged that a comprehensive evaluation can only be achieved through direct student participation and experience.

Accordingly, mechanisms for continuous feedback will be implemented to enable students to regularly express their perspectives, suggestions, and concerns. Such input will allow the instructional team to assess the course from the learner's viewpoint and to introduce evidence-based modifications. Student feedback will thus serve as a foundational element in shaping future iterations of the course.

The development and implementation of the course "FinTech in the Digital Economy" demonstrated the effectiveness of e-learning approaches in addressing contemporary educational challenges. The course design was guided by principles of accessibility, interactivity, and relevance to real-world financial technologies, with particular attention to the needs of students in times of crisis.

Throughout the course creation process, instructors enhanced their digital and pedagogical competencies, including the use of artificial intelligence tools (e.g., ChatGPT) for course design, glossary development, and formative assessment. Technical skills were further developed through the integration of interactive features within the Moodle environment, contributing to more efficient and engaging online instruction.

The course structure enabled students to acquire essential knowledge of digital financial technologies and develop key competencies outlined in the educational program. Learners benefited from clear navigation, continuous access to resources, and opportunities for communication with instructors and peers via dedicated chat channels and forums. Gamification elements were incorporated to increase motivation and engagement, while group projects and presentations supported the development of analytical thinking, teamwork, and public speaking skills.

Importantly, the course provided a secure and psychologically supportive learning environment, helping students maintain educational continuity and emotional resilience during wartime. These outcomes affirm the potential of thoughtfully designed e-learning solutions to deliver high-quality education under challenging conditions and to foster both academic and personal growth.

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ФІНТЕХ-ОСВІТА В ЦИФРОВІЙ ЕКОНОМІЦІ: ПІДХОДИ ДО ЕЛЕКТРОННОГО НАВЧАННЯ

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Анотація. Високі стандарти якості освіти в сучасному світі можуть бути досягнуті шляхом поєднання традиційних методів навчання з компонентами електронного навчання. Мета статті – представити результати роботи над створенням змішаного курсу «ФінТех у цифровій економіці» із застосуванням інноваційних підходів, штучного інтелекту та експертизи провідних науковців, щоб надати студентам можливість отримувати якісну освіту навіть у воєнний час. Дослідження також має на меті окреслити шляхи вдосконалення фінансової освіти шляхом інтеграції електронних методів навчання. Зокрема, показано, як використання інтерактивних платформ, мультимедійних ресурсів, гейміфікації та інструментів на основі штучного інтелекту сприяє підвищенню доступності, ефективності навчального процесу та оптимізації роботи викладачів.

Встановлено, що розроблені електронні компоненти дозволяють студентам навчатися у зручний для них час і темп. Завдяки цим компонентам навчальний процес стає більш інтерактивним, забезпечуючи доступ до широкого спектра навчальних ресурсів і інструментів, а також створюючи безпечніше освітнє середовище, особливо в умовах війни.

З'ясовано, що основні е-компоненти курсу повинні включати теми модулів і їхній зміст, опис дисципліни, цілі та результати навчання, інформацію про викладача, дві версії силлабусу (офіційну та в теплій тональності), термінологію курсу, навчальні матеріали, фінальний зворотний зв'язок. Курс повинен бути наповнений різноманітними методами гейміфікації (вибір термінів із глосарію, отримання нагород, щотижневі вікторини, рефлексії, презентації індивідуальних і групових проєктів тощо) для високої мотивації студентів.

Результати дослідження показали, що розробка е-компонентів навчальних курсів відкриває можливості для студентів отримувати якісні знання, розвивати аналітичне та критичне мислення, а також забезпечує безперервний і безпечний доступ до освіти.

Практичне значення полягає в тому, що запропонований підхід до створення змішаного курсу може бути адаптований для інших дисциплін і освітніх програм, особливо в умовах нестабільного середовища.