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ЗАСТОСУВАННЯ ІКТ ІНСТРУМЕНТІВ У СУЧАСНИХ УМОВАХ НАВЧАННЯ

У статті обґрунтовано актуальність застосування сучасних засобів ІКТ при навчанні майбутніх інженерів фахових дисциплін та іноземної мови в умовах карантину і воєнної агресії. Світова пандемія призвела до того, що в усьому світі до 2-х мільярдів дітей і молоді опинились за межами аудиторного освітнього процесу. Це спонукало держави до розширення процесів цифровізації, пошуку ефективних рішень для підтримки віддаленої освітньої взаємодії.

Проведений аналіз міжнародного досвіду та наукових джерел, у контексті застосування ІКТ в освіті, засвідчив інтерес світової освітньої спільноти до використання мобільних сервісів, месенджерів. На думку авторів статті, можливим дієвим засобом вирішення гострих та складних педагогічних проблем у дистанційній формі навчання є використання месенджеру Telegram, у якості засобу підтримки освітнього процесу.

Метою статті є проаналізувати переваги використання месенджера Telegram, як засобу підтримки освітнього процесу, в сучасних умовах карантинних обмежень і воєнної агресії, під час навчання майбутніх інженерів фахових дисциплін і іноземної мови; надати рекомендації щодо застосування чат-боту месенджера Telegram.

У статті представлено досвід використання месенджера Telegram, як засобу підтримки освітнього процесу на факультеті електроніки у Національному технічному університеті України «Київський політехнічний інститут імені Ігоря Сікорського», в умовах вимушених обмежень, спричинених світовою пандемію і воєнною агресією. Проаналізовано сучасні месенджери, зокрема Telegram, Viber, Facebook Messenger, WhatsApp, за визначеними критеріями та показниками. Окреслено переваги використання месенджера Telegram для підтримки освітнього процесу, зокрема: кросплатформність, підтримка синхронної та асинхронної взаємодії, можливість обміну повідомленнями різного формату, можливість забезпечити виконання багатьох педагогічних задач. Охарактеризовано суть, переваги та можливості використання інструмента чат-боту від месенджера Telegram. Надано психолого-педагогічні рекомендації щодо підвищення педагогічного ефекту від використання чат-боту від Telegram. Дослідження показало, що месенджер Telegram дозволяє здійснювати підтримку освітнього процесу в умовах неочікуваних та вимушених обмежень без втрати якісних показників, досягаючи педагогічних цілей.

Ключові слова: засоби підтримки освітнього процесу; месенджер Telegram; чат-бот; обмеження в умовах карантину і воєнної агресії.

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THE USE OF ICT MODERN LEARNING TOOLS APPLICATION IN TEACHING

The article substantiates the relevance of the use of modern ICT tools in the training of future engineers in professional disciplines and a foreign language in the context of quarantine and military aggression. The global pandemic has led to the fact that up to 2 billion children and young people around the world have found themselves outside the classroom educational process. This prompted states to expand digitization processes, search for effective solutions to support remote educational interaction.

The analysis of international experience and scientific sources in the context of the use of ICT in education has shown the interest of the world educational community in the use of mobile services and messengers. According to the authors of the article, a possible effective means of solving acute and complex pedagogical problems in distance learning is the use of the Telegram messenger as a means of supporting the educational process.

The purpose of the article is to analyze the advantages of using the Telegram messenger as a means of supporting the educational process in the current conditions of quarantine restrictions and military aggression, during the training of future engineers of professional disciplines and a foreign language; to provide recommendations for using the Telegram chatbot.

The article presents the experience of using the Telegram messenger as a means of supporting the educational process at the Faculty of Electronics at the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute», in the face of forced restrictions caused by the global pandemic and military aggression. Modern messengers, in particular Telegram, Viber, Facebook Messenger, WhatsApp, were analyzed according to certain criteria and indicators. The advantages of using the Telegram messenger to support the educational process have been identified, in particular: cross-platform, support for synchronous and asynchronous interaction, the ability to exchange messages of different formats, the ability to perform many pedagogical tasks. The essence, advantages and possibilities of using the chatbot tool from the Telegram messenger are described. Psychological and pedagogical recommendations on increasing the pedagogical effect of using the Telegram chatbot have been provided. The study has shown that the Telegram messenger allows supporting the educational process in conditions of unexpected and forced restrictions without losing quality indicators, achieving pedagogical goals.

Key words: means of supporting the educational process; Telegram messenger; chat bot; restrictions in the conditions of quarantine and military aggression.

One of the main characteristics of the modern stage of human development is the digitalization of all areas of its activities. Innovative technologies, including Internet of Things, Artificial Intelligence, neural networks, Machine Learning, immersive technologies, Virtual and Augmented Reality, etc. are changing the usual traditional processes: professional activity, formal and informal interaction, leisure, day-to-day decisions, learning, education, and self-development. Digital transformation involves both global economic phenomena and the formation of the professional identity of each individual.

The introduction of quarantine restrictions caused by the COVID-19 pandemic and military aggression

have made adjustments to the current functioning of Ukraine's national education system. Online learning methods and relevant services and tools have come to the fore. The COVID-19 pandemic has made online learning the norm for most people around the world. It is worth noting that the patterns established during the global pandemic remain relevant in Ukraine to this day, particularly in view of the crisis caused by military aggression.

Introduction. In the conditions of quarantine restrictions, higher education institutions around the world have directed their efforts to find solutions for the organization and support of the educational process using various means and technologies, including electronic content repositories and national virtual platforms, training management systems, cloud solutions (in particular, Microsoft and Google services, Edmodo, Zoom, Skype, WhatsApp, Blackboard, YouTube channels, email, messengers, etc.). UNESCO has developed a list of educational apps, platforms, resources aimed at helping educators, students and administrators facilitate the learning process and ensure social support and interaction during the pandemic. Most of these solutions are free and available in different languages.

At the same time, participants in the educational process had to face many challenges, including the need to overcome the digital gap, complications in teacher-student interaction, poor quality of the Internet connection, which makes it difficult to download and use training materials, limited technological infrastructure and capacity, socio-economic factors, lack of experience in conducting online knowledge control, additional workload for teachers, and incompatibility with some specific academic disciplines, decrease in student motivation, delayed feedback and support, feeling of isolation due to lack of physical presence, privacy issues and safety, difficulties in maintaining students' attention and involvement, etc.

The pandemic has led to the fact that up to 2 billion children and young people around the world have found themselves outside the classroom educational process. The educational sector was forced to change the approaches and methods of organizing training to a distance format. This prompted the expansion of digitization processes, the search for effective solutions to support remote educational interaction, which is confirmed by the latest research.

Research publications analysis. The analysis of foreign and domestic experience proved the interest of the global educational community in the introduction of mobile services, messengers, in particular the Telegram messenger, as a means of supporting the educational process.

The article by R. Singh [6], devoted to the problem of creating a personalized learning environment, considers the conditions for the introduction of artificial intelligence in education, in particular: teaching using chatbots, increasing student involvement, providing feedback, instant remote assistance (tips), effective support from teachers, and online data update.

In the research of Z. H. Iksan, S. M. Saufian [2], the feasibility of using the Telegram messenger in teaching graduate students is considered. A number of

types of educational and organizational activities that can be implemented using this service have been identified, in particular: monitoring of visits, discussions in small groups, exchange of educational files, etc. The survey showed that graduate students note an increase in creativity, a desire to generate new ideas (often spontaneous), a decrease in anxiety about the fear of rejection of their ideas by the group, enthusiasm for the learning process, etc.

Researchers M. Z. Iqbal, H. I. Alradhi, A. A. Alhumaidi et al. [3] investigated the attitude of medical students to the organization of online education during quarantine using the Telegram messenger. The respondents noted a number of advantages of the service, in particular: convenient access to a wide range of educational materials (lecture slides, e-books, websites, educational podcasts, forums, articles, etc.); the ability to share files regardless of their number and size; the ability to interact with classmates and teachers both synchronously and asynchronously; high level of reliability and security, etc. In general, the vast majority of students praised Telegram, recognizing it as an effective tool to support online learning.

It is also worth mentioning that researchers M. Azizi, E. Rassaei, M. S. Bagheri [1] analyzed students' awareness of mobile learning by studying the impact of various aspects of this concept on student satisfaction, as well as on the perception of the usefulness of mobile learning. The Telegram messenger was chosen to conduct the research, using which 12 mobile training sessions on learning the English language were implemented.

Spanish scientists identified the conditions that led to the spread of chatbots («virtual assistants») in the educational process, investigated the process of creating a chatbot and assessing its usefulness, analyzed the role of teachers in the implementation of this service [7], developed the design of a Telegram chatbot for teaching students in any subject using multiple choice tests [5].

Ukrainian researchers I. Tsidylo, S. Samborskiy, S.-I. Mazur, M. Zamoroz analyzed the advantages of the Telegram messenger, the requirements for a chatbot that contributes to the achievement of educational goals [8], N. V. Maiier, V. O. Yukhymenko described and analyzed the possibilities of using mobile technologies, in particular the Telegram messenger, in training professionally oriented English [4].

At the same time, there is a need to further research of the possibilities of using the Telegram messenger in the process of providing distance learning.

The purpose of the article. The purpose of the study is to analyze the benefits of using the Telegram messenger as a means of supporting the educational process in the current conditions of quarantine restrictions and military aggression; to provide recommendations for using the Telegram messenger chatbot.

Research methods. The following research methods were used in the study: the method of theoretical analysis of educational documents and scientific- methodological works on problematic issues of teaching pedagogy; generalization of own pedagogical experience; methods of generalization and

comparison of theoretical data, which can be used to show the practical application of innovative ICT; survey of students regarding the effectiveness of using the aforementioned innovations in the training of future engineers during the study of professional disciplines and a foreign language.

Presenting the main research material. A survey of students of the Faculty of Electronics of the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» (2022-2023 academic year) showed that 100% of them have constant access to mobile devices with an Internet connection (smartphone, tablet). At the same time, 78% of respondents had constant access to a computer connected to the network. In view of this, during the quarantine restrictions, we gave preference to mobile devices as the main means of educational interaction.

At the stage of selecting a mobile service (a messenger) to support the educational process, we conducted a survey among students and found out which messengers they prefer; carried out a comparative analysis of the characteristics of these messengers to choose the most appropriate one according to the specified criteria. The results of

students' survey (115 people) showed that they prefer messengers such as Telegram (97%), Viber (75%), Facebook Messenger (25%), WhatsApp (19%) and Snapchat (11%).

We compared the messengers most often used by students, determining the following criteria: *commerciality* (cost, presence of advertising); *functionality* (exchange of images, animations, audio and video files, documents; text links; voice and video messages; editing messages; replacing files; «marking» users in messages; replying to messages; mass mailing; creating groups; comments; structuring chats (folders /tabs, etc.), audio and video conferences; polls; chatbot support; viewing activity history; general statistics; use of cloud storage; search); *architecture* (synchronization on different devices; limitation of the number of devices for synchronization; OS support; internal memory); *security* (spam protection; blocking of unwanted content; end-to-end encryption for all chats).

Having assigned 1 point to the advantage for each criterion, we received a certain rating of messengers according to a number of characteristics (see Table 1 for more details):

Table 1

Comparison of messengers according to certain criteria

Criteria	Indicators	Telegram	Viber	WhatsApp	Facebook Messenger
Commer-ciality	Cost	Free	Free	Free	Free
	Advertising presence	-	+	+	+
	Points	2/2	1/2	1/2	1/2
Functiona-lity	Sharing images, animations, audio, video, documents	+	+	+	+
	Voice messages	+	+	+	+
	Video messages	+	+	-	-
	Editing sent messages	+	+	-	-
	Replacing a file in a sent message	+	-	-	-
	«Tagging» users, responding to messages	+	+	+	+
	Sending messages	up to 100	up to 25	up to 10	Requires activation of additional functionality
	Creating groups	+	+	+	+
	Adding comments	+	-	-	-
	Ability to structure chats (folders/tabs, etc.)	+	-	-	-
	Support for audio and video conferencing	+	+	+	+
	Creating surveys	Anonymous/non-anonymous, multiple choice, quizzes	1 answer choice	-	1 answer choice
	Chatbot support	+ (@BotFather and Bot API)	+ (Viber REST API)	-	-
	View action history and general statistics	+	-	-	-
	Cloud data storage	+	-	-	-
	Search	Text, by hashtags, by categories (chats, media, links, files, voice messages)	Textual	Textual	Textual

	Points	16/16	8/16	5/16	5/16
Architec-ture	Synchronization across different devices	+	+	+	+
	Limiting the number of devices for synchronization	Unlimited	Limited	Limited	Limited
	Operating system support	Android, iOS, Windows, MacOS, Linux, Wear OS, watchOS	Android, iOS, Windows, MacOS, Linux, Wear OS, watchOS	Android, iOS, Windows, MacOS	Android, iOS, Windows, MacOS
	Load on the device's internal memory	Stores only downloaded content	Stores all content	Stores all content	Stores all content
	Points	4/4	2/4	1/4	1/4
Security	Spam protection	+	-	-	-
	Blocking unacceptable content	+	+	+	+
	End-to-end encryption of all chats	-	-	+	-
	Points	2/3	1/3	2/3	1/3
	Total	24/25	12/25	9/25	8/25

After summing up the points (with the maximum possible score – 25), we get the following: Telegram – 24, Viber – 12, WhatsApp – 9, Facebook Messenger – 8. A comparative analysis of instant messengers according to the defined criteria showed that Telegram is the leader among other similar services.

Although messengers may differ slightly in their characteristics, they are all important tools for modern communication and networking and have a number of common features: they are free, support for data exchange in various formats (images, animations, audio, video files, documents, etc.), the ability to create groups, synchronization across devices, etc.

Summarizing, it is advisable to highlight the following advantages of using Telegram Messenger to support the educational process: *cross-platform* (the ability to use it on various gadgets and platforms, including Android, iOS, Windows Phone, Windows, macOS, GNU/Linux); *support for synchronous and asynchronous interaction* (the ability to use the messenger both in real time (synchronous format) and independently in time, anywhere and anytime (asynchronous format)); *the possibility of exchanging messages of various formats* (text, voice, photo and video messages, files of various formats, hyperlinks to external resources); *support for various types of interaction* (conducting audio and video calls, organizing web conferences, groups, channels); *the ability to perform many pedagogical tasks* (presentation and repetition of educational material, knowledge control, etc.). At the same time, we can add material either directly in the messenger itself or by using hyperlinks to external sources (video clips, test programs, etc.).

Thus, the results of the student survey, the analysis of the characteristics and the comparison of different messengers led to the choice of the Telegram messenger as a means of supporting the educational process.

Among the important functionality of the Telegram messenger, it is also worth noting the possibility of creating сhatbots, which is a promising tool for supporting the educational process based on artificial intelligence.

In a general sense, a chatbot is a program that automates interaction with a user according to a certain scenario. The chatbot can «communicate» with a user, provide information and answers to questions, and fulfill requests. The «communication» is carried out by means of text chat or voice commands. Usually, chatbots are linked to certain websites, social networks, messengers, etc.

A typical chatbot operation can be summarized in the following sequence of actions: receiving a user's request – determining the user's intentions; performing actions according to a predetermined script – processing the user's case; generating a response for the user; API access to an external program (if necessary); transferring the request and dialog parameters to the database for further processing of the request.

Taking into account our own practical experience, we can identify psychological and pedagogical recommendations and certain nuances that should be taken into account when creating a chatbot for educational purposes: – when creating a chatbot, it is advisable to develop its general concept, i.e. to determine the purpose of its creation, the target audience and the tasks that we plan to solve using this tool; – pay attention to the identity of the chatbot – its avatar, name, communication style, etc.; – think over the structure, intelligence map of the future chatbot, plan the User Journey Map; – foresee and lay down the chatbot's reactions («answers») to each possible user request; – think carefully about the educational material posted in the chatbot, which should be compact and as clear as possible; – include tasks of various formats in the chatbot; – fill the chatbot with useful links and resources; – lay down the possibility of control and self-control; – provide opportunities for feedback with the teacher to allow students to receive remote consulting and pedagogical support; – provide opportunities for feedback with students.

During the academic year 2022-2023, under the conditions of forced quarantine restrictions and military aggression, the authors organized an educational process with students of the Faculty of Electronics of the National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute» using the Telegram messenger. Taking into account the

advantages indicated in the previous paragraph, this messenger was chosen as the main tool for educational interaction, both synchronous and asynchronous (chatbot, text and voice messages, etc.).

At different stages of the research, students were surveyed to find out their preferences regarding messengers and their functionality, satisfaction with the organization of classes using the Telegram messenger, identifying problems, advantages and needs for further improvement of the educational process. Respondents noted that they use Telegram more often than other messengers.

According to the survey, 100% of respondents have constant access to mobile devices with an Internet connection (smartphone, tablet) and the Telegram messenger is the leader among other services. When organizing the course «Practical Foreign Language Course for Business Communication», 36 hours of practical classes using the Telegram messenger were conducted with each group of students. At the end of the course, students were asked to evaluate this form of work. So, among the advantages, students noted: the simplicity of using the Telegram messenger (85%), the convenience of using it on different platforms (72%), free of charge (80%), high-quality connection (55%), and reliable data protection (51%). Among the problems, students noted an unstable Internet connection (30%), which caused interruptions in the messenger (15%). For 5% of respondents, the interface was unclear.

As for the changes that students would like to propose to improve the educational process using the Telegram messenger, 7% noted the desire to increase the amount of multimedia content, add more accompanying audio and video segments.

In general, students positively assessed the educational activities using the Telegram messenger in the context of quarantine and military aggression by choosing the following answers: «Very good» (44%) and «Good» (51%).

It is important to note that our goal was to introduce a tool that would allow us to support the educational process under unexpected and forced quarantine restrictions without losing quality indicators. Therefore, we believe that the set goal has been achieved. The Telegram messenger is a tool that allows you to support the distance learning format while maintaining the quality of the learning results. So, it is advisable to follow the recommendations outlined above.

Conclusions and further research prospects. The quarantine restrictions caused by the Covid-19 pandemic and military aggression have made adjustments to the functioning of Ukraine's national education system. Online learning methods and related tools, software tools have become the object of intensive search and have gained wide application.

The need for a quick and prompt establishment of the educational process in the context of an unexpected crisis contributed to the fact that popular among students and at the same time multifunctional and easily customizable digital services, even of a non-educational nature, began to spread rapidly.

Our observations, survey results and analysis of student learning outcomes confirmed the following: –

Telegram messenger as a tool to support learning under quarantine restrictions was chosen appropriately. Thus, students, being active users of this messenger, effectively joined the educational interaction without spending extra time on installing the program, studying the interface elements and functionality, etc.; – the functionality of the Telegram messenger allowed to meet the needs of all participants of the educational interaction (both teachers and students) to a greater extent, to use various means, methods and techniques of work: chatbots, conferences, text and voice messages, video fragments, etc.; – a combination of various synchronous (audio and video conferencing) and asynchronous tools (chatbot, data of various formats: text, voice messages, video clips, polls, tests, etc.) made it possible to effectively achieve didactic goals.

It should be emphasized that in order to ensure a high-quality, effective educational process in higher education establishment in the context of forced distance learning, it is advisable to select program solutions taking into account the specifics of the target audience, the advantages and disadvantages of the means, its availability and reliability, and the appropriateness of its use for solving a specific educational task.

We consider the development of the structure of the Telegram chatbot to support the educational process, as well as the justification of recommendations for its use, to be a promising direction for further research into the outlined problem.

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ВІДОМОСТІ ПРО АВТОРІВ
ЛОМАКІНА Лариса Володимирівна – старший викладач кафедри англійської мови технічного спрямування №1 Національного технічного університету України «Київський політехнічний інститут імені Ігоря Сікорського».
Наукові інтереси: інформаційно-комунікаційні технології в освіті, методи навчання іноземних мов на нелінгвістичних факультетах.

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ПЕРСПЕКТИВНІ ШЛЯХИ ВИКОРИСТАННЯ ЗАСОБІВ І СЕРВІСІВ ШТУЧНОГО ІНТЕЛЕКТУ ЄВРОПЕЙСЬКОЇ ХМАРИ ВІДКРИТОЇ НАУКИ ДЛЯ ПРОФЕСІЙНОГО РОЗВИТКУ ПЕДАГОГІЧНИХ КАДРІВ

В статті досліджується проблема використання сервісів штучного інтелекту Європейської хмари відкритої науки для професійного розвитку педагогічних кадрів. Більшість науковців досить серйозно ставляться до цієї проблеми, оскільки використання сервісів штучного інтелекту (загалом) в освітньому процесі може призвести до серйозних загроз. Окремі аспекти цієї проблеми можна вирішити завдяки правильному використанню сервісів штучного інтелекту, оскільки поряд із загрозами науковці досліджували і можливості та переваги використання сервісів даного типу в освіті (при цьому переваги явно перевищують недоліки тому постає питання їх виваженого та методично обґрунтованого використання). Якщо ж розглядати сервіси, що розміщені на порталі Європейської хмари відкритої науки, то існує досвід їх позитивного використання в освітньому процесі, попередньо було проведено серія заходів для навчання освітян базовим елементам використання інструментарію порталу. Зокрема, сервіси штучного інтелекту також наявні на даному порталі і є абсолютно безкоштовними. Для визначення перспективних шляхів використання засобів і сервісів штучного інтелекту Європейської хмари відкритої науки для професійного розвитку педагогічних кадрів попередньо було розроблено класифікаційну схему сервісів штучного інтелекту (загальну). В якості класифікаційної ознаки було обрано учасників освітнього процесу: керівництво установи, викладачі/вчителі та студенти/учні. Орієнтуючись на встановлену класифікацію та специфіку сервісів штучного інтелекту порталу Європейської хмари відкритої науки було визначено шляхи їх використання: для мотивації навчання здобувачів освіти; для кращого сприняття та усвідомлення нового матеріалу; для виявлення зв'язків між новими та попередніми знаннями; для розвитку критичного мислення здобувачів освіти; для встановлення міжпредметних зв'язків; для створення проблемної ситуації; для поглибленого вивчення теми чи модуля; для