Using the Discord Platform in the Educational Process

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Abstract: The paper reveals the results of a study of the feasibility of using the Discord platform in a blended learning environment in higher education institutions. The authors conducted an in-depth analysis of research on the creation and establishment of convenient and productive elements of distance learning (methods of building distance learning courses, special needs of distance learning, requirements for distance learning platforms). The authors believe that modern distance education systems do not fully use the opportunities of blended education, which creates conditions in which the educational process does not use its maximum potential, which leads to a decrease in the level of intensification of education. The main problem, scientists consider the insufficient level of development of distance communication systems and, in order to solve the problem, conduct an experiment on the basis of the Department of Informatics and Cybernetics of Melitopol State Pedagogical University named after Bohdan Khmelnytsky platform Discord as an environment of educational process offline during distance learning, quarantine caused by the global pandemic virus COVID-19.

1 INTRODUCTION

Analyzing the statistics, we can note that 2020 was the year of global informatization of all segments of human activity, the reason for such an increase in the need for IT development, was the global pandemic virus COVID-19. Of course, among the leading problems of mankind, there is the problem of education in full or partial quarantine, which in turn has become a catalyst for research in a particular vector of the educational process in a pandemic. Carrying out a preliminary analysis of research, we can note a significant increase in the number of scientific publications on the educational process in the languages of blended and distance learning, among the leading areas of research are: development of adaptive testing systems for students, use of automated learning systems, process. However, we can note that the educational process, especially in secondary and vocational education requires closer contact when communicating with the teacher and creating conditions for synchronous communication and a preliminary analysis of scientific sources showed insufficient study of this issue, which confirms the relevance of our research

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analysis and development of recommendations use of distance communication systems in terms of quality learning process on the example of using the Discord platform.

2 RELATED WORK

Before the analysis of current research in a particular area, we decided to identify the leading vectors of our selection, it was noted:

- scientific developments on determining the specific needs of participants in the learning process in terms of distance and blended learning;

- scientific developments on the peculiarities of the use of the platform identified in the study;

- scientific developments on the coverage of the experience of using the means of distance communication during the educational process in terms of distance and blended learning.

Thus, we expected to get a comprehensive and comprehensive vision of the problem and ways to solve it, to analyze the experience of using remote communication tools by scientists and teachers around the world and to develop recommendations for the use of the platform identified in the study.

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First of all, it is appropriate to note the contribution of scientists who focused their work on determining the fundamentals of the development and conduct of distance or blended learning, among them important in our study were (Bilousova et al., 2021; Kalashnikova et al., 2022; Kukharenko et al., 2022; Martyniuk et al., 2021; Nofandi et al., 2020; Osadcha et al., 2021; Voloshinov et al., 2020).

Methods of using online communication and the problem of creating high-quality blended learning in general quarantine are revealed in (Osadcha et al., 2020; Ovcharuk et al., 2022; Oyegoke et al., 2021; Tkachuk et al., 2022; Trubavina et al., 2021).Important for our study was the work of Jiang et al. (Jiang et al., 2019), who partially revealed the features of the problems of moderation of voice associations, in particular the problem of cyber-bullying, incitement to hatred and other social problems. Based on the preliminary analysis of the sources regarding the actual topic of the study, it is important to note the contribution of Odinokaya et al. (Odinokaya et al., 2021), Arifianto and Izzudin (Arifianto and Izzudin, 2021), Vladoiu and Constantinescu (Vladoiu and Constantinescu, 2020), Lacher and Biehl (Lacher and Biehl, 2018), Ardiyansah et al. (Ardiyansah et al., 2021), Di Marco (Di Marco, 2021), Warni et al. (Warni et al., 2021), Uong et al. (Uong et al., 2022), Wiles and Simmons (Wiles and Simmons, 2022) and Mock (Mock, 2019). These scientists conducted similar experiments on the introduction of the Discord platform in educational institutions and revealed the peculiarities of their experience, which enabled a significant expansion of the research framework and served as a basis for further work.

3 FEATURES OF USING THE DISCORD PLATFORM IN THE LEARNING PROCESS

Starting research on the use of any software to create conditions for quality distance communication during the educational process, it is advisable to analyze the current scientific developments on the fundamental pedagogical principles of implementation and use of distance education to further verify the feasibility of using the Discord platform in education. process. For this purpose it is expedient to refer to the works of Valko and Osadchyi (Valko and Osadchyi, 2020), Voloshinov et al. (Voloshinov et al., 2020), Bykov (Bykov, 2008), Kyslova and Slovak (Kyslova and Slovak, 2015), Kukharenko et al. (Kukharenko et al., 2022), Dushchenko (Dushchenko, 2020). Thus, according to Bykov (Bykov, 2008), we can identify priority properties that are common to all distance learning systems:

- *Flexibility and adaptability*. Students generally do not attend regular classes in the traditional form, but work at a convenient time in a convenient place and at a convenient pace, which provides great benefits for those who can not or do not want to disrupt their usual, active social life.

- *Modularity*. The modular principle is the basis of distance learning programs. Each individual course creates a holistic view of a particular subject area.

- *Economic efficiency*. Due to the use of a more concentrated presentation and unification of the content of educational material, the focus of distance learning technologies on a large number of learners, more efficient use of teaching staff and material and technical base that provide training.

- *New role of the teacher*. The teacher is entrusted with such functions as: coordination of the cognitive process, adjusting the course being taught, advising on the development of an individual curriculum, management of educational projects, checking current tasks, and so on.

- *Specialized quality control of education*. In distance education, both traditional forms of quality control of existing and received education, and distance forms of such work are used.

- *Use of specialized technologies and teaching aids*. Distance learning uses special technologies: case technologies; television technologies; video conferencing technologies; combined technologies. Distance learning technologies combine most of the existing teaching methods and give them a qualitatively new educational and technological level.

The central link in distance learning is the means of telecommunications and their transport base. They are used to provide the educational process: the necessary educational and methodological materials; feedback between the teacher and the learners; exchange of management information within the distance learning system; access to international information networks.

In summary, it can be argued that the tools and methods of distance learning form a unique distributed environment, which provides the main features, benefits and problems of this promising form of education.

Bykov (Bykov, 2008) describe modern means of distance learning that adhere to certain properties, but

this range of tasks cannot be fully accepted in the conditions of long-term learning during an emergency situation. This is primarily due to the low level of preparedness of educational institutions for such situations and the low level of preparation of modern students and schoolchildren for conditions of complete isolation and independence in learning. Osadchyi and Varina (Osadchyi and Varina, 2020), Osadchyi (Osadchyi, 2019) and Bykov (Bykov, 2008) claim that the system environment of distance learning is a set of methods and software that ensure the implementation of remote distance learning technology. In our opinion, such an environment can be formed in two ways: 1) using distance learning platforms (systems) (examples may be Moodle, Lotus Learning Space, Blackboard Learning System and others); 2) through a set of services and services of the Internet (blog, e-mail, online board, online video and audio, chats, forums, online testing tools, online presentations, electronic libraries, book publishing services etc). That is, the use of only one online resource at the present stage of development of distance learning does not provide a sufficient number of functions necessary to create conditions for quality distance learning, there is a need to use a set of resources to comprehensively cover distance learning.

Modern distance learning systems allow full interaction with educational content and testing and other forms of control, but communication between teacher and student takes place in chat or video conferences, which are not convenient for the student on a number of issues, the main of which there is insufficient provision of remote settlements with quality material support (high-speed Internet, the latest computer software, etc.). This leads to the impossibility of the student's perception of information in full. Analyzing a similar situation in terms of the educational process in schools, we can say about the low level of readiness of students for self-study and the need for constant interaction between teacher and student in the usual usual format of the lesson.

Analyzing the functionality of modern distance education systems on the example of Moodle, Lotus Learning Space, Blackboard Learning System (Bukreiev, 2020) it was determined that these systems are developed in the vector of asynchronous communication to create greater mobility, but the direction of synchronous communication needed by students quarantine is almost absent. This determines the need to use additional software to create quality conditions for synchronous communication.

As part of the study, we identified the main tasks to be performed by the online communication system. So we were defining general learning objectives as

the distribution of tasks for the teacher. They emphasize the need to decide what needs to be done in the classroom, what can be learned, studied and solved at home, which tasks are suitable for individual lessons, and which – for group work on the project. It is important that lessons take the form of project defense, presentation, debate or discussion between students or the teacher with students, which in turn confirms the need for "live" synchronous communication. The electronic unit should contain projects for group work, creative, laboratory and practical tasks, reference materials and links to additional materials on the Internet, intermediate and test tests, as well as tasks of increased complexity for gifted students. Thus, the online communication system must satisfy the possibility of conducting classes in the form of project defense, presentation, debate or discussion between students or teachers with students, ie the system should allow a large number of users to communicate and access visual material on their computer. users. Thus, we can say that the creation of conditions for quality active interaction between teacher and student, especially in the context of distance learning of students, is mandatory. Under quarantine, students can quickly use their motivation, which will reduce the quality of learning, so the use of distance communication should enable students and teachers to conduct quality and productive communication with the addition of multimedia education. Summarizing the general needs and tasks assigned to online communication services, we can determine that the service should meet the following needs: low load on the computer and the Internet; the ability to create conferences in real time; providing the ability to simultaneously display the screens of all participants in the learning process; providing the opportunity to communicate in the mode of individual consultation, or consultations of a small group of users; creating a visual intuitive server interface for users; the ability to administer the server and configure user rights.

Thus, having analyzed and identified the general objectives and needs of the online communication service, we will analyze the features of the Discord platform to verify the feasibility of its use. Discord has support for Windows, macOS, Android, iOS, Linux and runs on all browsers. Determining the system requirements for the computer for the normal operation of the program, we can note the low level of load on the system, for greater visualization, we conducted a comparative description of system requirements between three software tools focused on video conferencing, the most popular nowadays is Skype, Zoom and Google Meet (table 1).

Thus, we can say that Discord requires a lower

Table 1: Comparative characteristics of the minimum system requirements of Skype, Zoom, Google Meet, Discord.

Feature	Skype	Zoom	Google Meet	Discord
Processor	1 GHz	3 GHz	2 GHz	1200 MHz
Hard disk space	200 MB	500 MB	200 MB	256 MB
RAM	512 MB	8 GB	512 MB	256 MB
Bit architecture	x86, x64	x86, x64	x86, x64	x86, x64
Operating System	Windows, Linux, Mac OS X, Android, IOS	Windows, Linux, Mac OS X, Android, IOS	Windows, Linux, Mac OS X, Google Chrome OS	Windows, Linux, Mac OS X, Android, IOS

level of load on the system and works with almost all operating systems. A significant advantage of using Discord is also a simple and fast software launch system, for this you need to download the program from the official website, install it and go through the registration procedure. Then you have the opportunity to send invitations and start communicating. Convenience is confirmed by the fact that for Discord there is no need to install a client, the user can communicate through a browser. To do this, you will need to send him an invitation link. This method of use greatly simplifies the system of interaction between teacher and student in a constant academic mobility, because the system allows mobile connection to the server from any access point and platform. This creates the necessary learning mobility conditions that are required in distance learning during quarantine, but other systems for webinars have not been developed. For such systems, the presence of the installed software and all plug-ins to it is mandatory.

Discord is a completely free platform that does not contain hidden payments or premium subscriptions, which is very important for state and purely educational institutions in the economic situation of the state. Stable operation, good communication quality and simplicity of the interface confirm the expediency of using Discord by users of any skill level. In addition, the platform has features: Push to talk and voice activation, the system allows you to create conditions for simultaneous communication of a large number of user groups, while communication in other software is exclusively synchronous or asynchronous and requires a large number of mutually exclusive connected servers to provide training of one course / flow / school / etc. The platform allows you to add interlocutors to friends and make direct and group calls with text chat support, which creates conditions for working with students with high levels of nervousness and students with low levels of logistics, which causes problems when working with the general flow of students.

The analysis causes an increase in the level of relevance of the use of Discord, but this is not enough to determine the overall feasibility of the selected platform, so it was decided to turn to the works of Striuk (Striuk, 2021, 2022). The authors use the example of training future software engineers to reveal the need for intensive training of future professionals for professional activities and emphasize that it can be effective only if the range of organizational and pedagogical conditions of its operation. In this case we can say that opportunity: creation of high-quality conditions for conducting practice-oriented individualized practical and seminar classes, motivating students to study the subject component through a multimedia worldview during the learning process, motivating students to self-study and self-improvement; establishing synchronous learning in terms of full interaction between teacher and student; involving students in creating a personal information environment.

As we have already mentioned, creating conditions for improving the level of students' motivation for self-study is one of the most important tasks of any distance learning system. Taking into account a certain range of requirements for a modern remote communication system and to further verify the feasibility of using Discord, we will conduct a comparative analysis of software functions when working with them, for comparison we will also use Skype, Zoom and Google Meet (table 2 and table 3).

Based on the results of the analysis, it can be argued that there is a significant advantage in the use of Discord compared to other software tools in the vector of creating quality conditions for synchronous educational process. The problem point of Discord remains the limitation of the number of users on one video channel, but given the need for small groups of up to 30 students, this factor can be considered weightless.

During the study, a detailed review of the possibilities of working with Discord was conducted:

1. *Create an unlimited number of servers*. Creating the conditions for a quality management system of the educational unit is the most important factor in the development of the distance learning system. Thus, the problem arises in the absence of modern

Table 2: Positive characteristics of Skype, Zoom, Google Meet, Discord software functions.

Function	Skype	Zoom	Google Meet	Discord
Individual text messages	+	+	+	+
Conference text messaging	+	+	+	+
Individual calls	+	+	+	+
Conference calls	+	+	+	+
Screencast	+	+	+	+
Ability to control users	+	+	+	+

Table 3: Negative characteristics of Skype, Zoom, Google Meet, Discord software features.

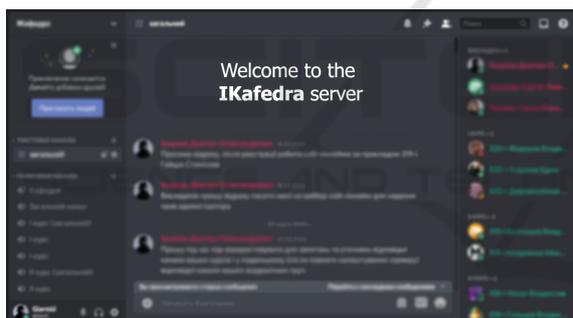| Function	Skype	Zoom	Google Meet	Discord
Multiplayer screen	-	-	-	+
User rights settings	$\pm$	$\pm$	-	+
Creating parallel channels	-	$\pm$	-	+
Connecting bots	-	-	-	+
Restrictions on the number of users	-	-	-	-
Limitations on the number of concurrent video conference participants	25	-	-	50
Set voice priority	-	-	-	+
User Activity Report	-	-	-	+
Server moderation	-	+	+	+
Creating a separate server	-	+	+	+

Figure 1: Developed a distance learning server on the Discord platform.

remote communication systems. With the functionality of the Discord platform, a high-quality system for the distribution of training units has been created, which allows for full stratification of user rights and a transparent monitoring system (figure 1 on the left). In terms of the learning process, this feature allows you to create a large number of servers that can conditionally divide the overall structure of distance learning into clearly defined groups (division by faculties or classes). Subject to the development of a quality server system, conditions are created for further reporting and quality control of the educational process by moderating each individual structure of the learning environment.

2. *Configure the interface language and general information about the server.* Analyzing the needs of the learning space, we identified the need to create a high-quality and clear interface of online communication servers to create conditions for high-quality perception of information by students or schoolchildren. To solve this problem, Discord has created: the ability to define the language region of users; setting up an instant notification system; creation of AFK-channel for automatic transfer of currently inactive users to a separate room, which in turn allows you to reduce the load when working with individual channels; creating a unique server logo, for greater separation of each individual server. This feature allowed us to create a high-quality clear interface for all participants in the learning process. Thus, students and teachers already at the initial stage had an intuitive interface that allowed to start work without a long period of training and training of users in the skills of using the platform. What works best during training is important to create conditions for quality learning of foreign languages, so for foreign language classes it is advisable to create a server using the interface of the language, which will qualitatively affect the learning process through full immersion.

3. *Creating an unlimited number of text and voice communication channels.* One of the main problems of the total number of remote communica-

tion systems is the development of asynchronous communication and the need to use a single communication channel. This problem significantly affects the possibility of conducting streaming classes in terms of distance learning in the long term. Modern systems of remote communication, in the long run, need to create a developed system of synchronous communication and the ability to create a large number of parallel channels for different academic groups. The previous analysis showed the need to create a common system that would be able to use the school in full. This need determines the need to create separate communication channels for each group or class, to solve this problem, Discord provides a fairly optimal system (we can see the implementation in figure 1) to create an unlimited number of voice and text channels. Thus, we were able to create a stream of learning and a system of quality synchronous communication of all academic groups of students in the distance learning.

4. *Create invitations of new users by invitation-link, invitation from the list of friends, invitation by creating a widget for the site*. In emergency situations, first of all, there is the problem of creating a single channel of communication, which creates aggressive conditions that do not allow quality dissemination of information and general acquaintance of all users with the future form of work. When using Discord, server administrators have the ability to create user invitations in several different ways, such as creating new user invitations by invitation-link, Discord friend list invitation, and invitation by creating a site widget. This allows full coverage of all communication channels of recipients of training services in order to speed up their connection to the general system. Using a certain range of ways to invite users, in the conditions of our experiment we managed to deploy the server within one week and fill it with users.

5. *Configure user roles*. To create conditions for quality operation of the remote communication server, there is a need for extensive rights of users, in order to prevent offenses by users of the server. Thus, we have developed a system of strict stratification of user rights. This simplified the server management process and the process of monitoring user actions. With the help of a well-developed system of rights, a number of measures were taken to ensure the quality of education (checking couples by the head of the department, mutual visits of couples by teachers of the department).

6. *Setting access rights for different communication channels*. As mentioned above, in order to create conditions for quality operation of the remote communication server, it is necessary to branch out the work areas of each individual user or user group, therefore there is a need to configure access rights of each user group to individual communication channels. channel "Faculty Council"). This creates a clear stratification and user management system, as shown in the figure, creating separate text channels for use by individual courses and channels for use by each individual study group.

7. *Audit journal and moderation*. It is important in the work of distance learning systems and services for their operation is to create a high-quality reporting system, in order to create such a system in Discord created a quality system of moderation and audit, which allows visual and textual display of each user's actions. opportunity to check the quality of work of teachers and students. Thus, we were able to fully verify all the actions of participants in the learning process and conduct transparent monitoring of the success of user actions. With the help of this system, the administration of the educational institution has the opportunity to take similar measures to check the quality of the educational process and the availability of teachers and students in the classroom.

8. *Pin messages for each of the channels*. During the work of the educational institution an important factor is the early and high-quality dissemination of information among all participants in the educational process. Typically, systems that work in real time have the ability to quickly "clutter" the open text chat, to create the ability to separate and highlight the most important messages, created the ability to pin messages in each text channel. Thus, we have created conditions for the dissemination of information among users without determining the date of their connection to the system. This has greatly facilitated the information process due to the gradual connection of new users to the platform over a period of time.

9. *Live broadcasts*. The most important feature of each system of distance communication in a quality learning process is the ability to conduct online broadcasts by both teachers and students, this is primarily due to the need for quality transmission of information during lectures, and the possibility of feedback (student comments, questions, screen display for verification and clarification, etc.). Discord's GoLife mode allows you to display a specific application or screen in real

time, and all registered users with a defined access and installed Discord software can connect to this broadcast. Thus, we managed to create conditions for a quality process of conducting classes, which fully allowed to reproduce the usual format of classes. This created a reliable channel of active communication between teachers and students, which helped increase the number of active students and increase the level of activation of students.

10. *Management of user communication tools.* In the conditions of active work of a large number of simultaneous users (especially work with primary and secondary school students) there is a problem with conveying information due to too high a level of noise, usually the causes of noise can be: microphone noise; general household noise of users; presence in the group of energetic and restless students and more. To solve this problem, it is possible for administrators of the system of user communication to have full control. This function includes: reducing the level of "voice" of each individual user; mute the user's microphone, mute the speakers / user headphones. Using certain functions, you can solve problems with the conditions of high-quality information transfer in the shortest possible time.

As part of the study, we conducted an experiment that took place over one year in two stages, in the first stage (March-May 2020), the developers of the Discord platform were ambivalent about the use of the platform in the educational process, as the platform was primarily developed as a tool communications during the gaming process, but under the first quarantine, the number of simultaneous broadcasts was expanded to 25 people in one voice channel, which generally made it possible to use the platform for educational purposes. However, at this stage we noticed a number of significant problems that occurred when using the platform, namely: high noise levels during communication, problems with video connection and broadcasting in some students, problems with low bandwidth of Discord servers and insufficient the level of informativeness of user instructions. In addition, minor problems included the lack of a Ukrainian-language interface and a generally insufficient range of languages for use on the server and encryption of documents when sent in messages, which led to the need to disclose more information before sending. However, all these problems were found to be insufficiently critical to complete the experiment. During the first half of the year, the developers of the platform completed improvements and today we can emphasize the correction of a significant num-

ber of significant problems related to the first stage of the experiment, namely: a new noise reduction system for Krisp communication was developed and the system for configuring audio input and output and video information, which in turn solved the problems of most students; The developers carried out high-quality work on debugging and expanding the server part of the platform, which solved the problem of low bandwidth.

At the first stage of the experiment (March-May 2020) a remote communication server was created and implemented on the basis of the Department of Informatics and Cybernetics of Bohdan Khmelnitsky Melitopol State Pedagogical University for students of I-III courses: 122 Computer Science, 014.09 Secondary Education (Informatics), 015 Vocational education. During the first stage of the experiment, a number of measures were taken to check the quality of interaction between students and teachers:

1. *General organizational and educational hour.* During this event, conditions were created for the simultaneous transmission of three parallel simultaneous broadcasts with first- and third-year students. This approach, unlike other remote communication software, creates conditions for uniting students and teachers in improvised groups, which have an active connection with each other, which allowed the general information of a large number of students and receiving feedback from them at the same time. This qualitatively reduces the time required for work and creates the conditions for intensification of the learning process in terms of distance learning.

2. *Mutual visits and verification.* During training it is very important to create an opportunity to check the quality of classes. With the help of the developed server, we created the possibility of fast transition between channels, which enabled the administration departments of the educational institution to conduct a qualitative check of the presence of students in pairs and the quality of their education. A big problem in the conditions of distance learning is the problem of mutual visits of teachers in order to check the quality of education, improve the educational process or gain experience of teaching by young teachers from the faculty. In the conditions of the developed server and the period of the experiment, a number of mutual visitation activities were carried out, where the teachers had the opportunity to join the pairs of their colleagues and follow the course of the lesson. They had the opportunity, if necessary, to ask questions or clarify, join the broadcast and turn on their own.

3. *Conducting classes online.* During the whole period of the experiment, classes were held on the basis of the distance learning site of Bohdan Khmelnitsky Melitopol State Pedagogical University (https://dfn.mdpu.org.ua), but direct communication, lectures and seminars were held on the Discord server. According to a survey of teachers and students, which was attended by 102 students and teachers (table 4), 41.18% answered about the significant negative impact of quarantine measures on learning, but after the introduction of the Discord platform 74.51% of respondents said that significantly increased the quality of perception and transmission of information, students had the opportunity to ask questions during the lecture broadcast, and teachers could adjust their report or explanation of students' questions.

4. *Conducting active seminars.* During the period determined by the experiment, laboratory and seminar classes were conducted strictly in the order determined by the schedule. In the process of pairing, conditions were created under which students simultaneously launched parallel broadcasts on one voice channel and performed tasks, transmitting their work to the teacher, this process significantly accelerated the lesson and all tasks. Focusing on further comments from students, it can be emphasized that it has become much easier for students to complete classes in an environment where the teacher can look around and advise on possible approaches to solving problems. In addition, the opportunity for students to join each other's broadcasts was a qualitative fact, which created conditions for working in groups.

5. *Work in online groups.* Creating conditions for synchronous work and connecting students to broadcast each other, created conditions for group work, so students, divided into groups, developed individual projects under the supervision of the teacher, then on the general channel, were performances and defense projects of each group.

Carrying out of these actions acted in confirmation of expediency of use of the created system and confirmation of expediency of use of the Discord platform as it provides opportunities for carrying out certain actions while the majority of them are impossible in realization on other systems for carrying out webinars.

The survey (table 4) showed a qualitative increase in the level of students' interest in the educational process in quarantine, so 83.33% of students adopted the new system as a quality application to create conditions for synchronous communication with teachers in quarantine, 75.51% of students emphasize that the system greatly simplifies the process of perception of

information and 77.45% consider Discord more convenient than the currently available software. However, 82.35% of students emphasize the need to develop distance communication systems, and 80.39% say the need to improve the educational server Discord to expand its pedagogical potential. We consider it appropriate to address the direction of automation of student management processes in pairs, development of bots for the server and training on the use of the platform in general.

We consider it important to determine the factor of psychological isolation of students, so when asked about the use of audio and video, only 79.41% and 38.24% answered positively. This highlighted the need to create quality conditions to reduce the emotional load on students and reduce their stress during training through pedagogical and psychological training, development of automated learning and confidence-building measures during the adaptation of first-year students.

During the first stage of the experiment it was determined that the constant activity of students in interaction with teachers (online lectures, visual seminars, etc.) in the system of distance communication, leads to a qualitative increase in the quality of student interaction. Summing up this stage, we can say about improving the quality of the educational process by activating the desire of students to continue their studies in a familiar and convenient for them, which is as close as possible to real classes. To this end, we considered it appropriate to state that a number of activities are mandatory in the context of long-term distance learning. Creating a remote communication system for these activities is a priority. These measures include:

1. General organizational and educational hour.

2. Mutual visit and check.

3. Conducting couples online.

4. Conducting active seminars.

5. Work in online groups.

To carry out these activities, a system of monitoring the conduct of classes and the opportunity for students and teachers to visit couples who are not part of the spectrum of their personal influence was created. This made it possible for teachers and the administration of the educational institution to check the quality of the educational process, and students had the opportunity to create their own individualized vector of education by visiting additional pairs with the permission of the teacher. Thus, a system was created to fully cover all the needs of educators to create a quality educational environment in terms of long-term

Table 4: Survey of students and teachers on the feasibility of using Discord in the educational process (%).

Question	Yes	No	It is difficult to answer
Have you been negatively affected by the transition to distance learning during quarantine?	41.18	32.35	26.47
Do you use the Discord platform while studying?	83.33	16.67	0
Does the Discord platform make the process of perceiving information in pairs easier for you?	74.51	18.63	6.86
Do you combine the use of a distance learning site with the Discord platform?	76.47	16.67	6.86
Do you find Discord more convenient than other online communication software (Skype, Zoom, Google Meet, etc.)?	77.45	9.80	12.75
Do you use audio communication in your work in pairs?	79.41	20.59	0
Do you use video communication in your work in pairs?	38.24	61.76	0
Has the notification process improved since the launch of the Discord platform?	69.61	8.82	21.57
In your opinion, is it important to further develop the system of remote communication?	82.35	2.94	14.71
Is it necessary to refine the Discord training server to expand its pedagogical potential?	80.39	0.98	18.63
In your opinion, is it appropriate to use Discord in your learning process?	79.41	3.92	16.67

distance learning. This confirmed the assumption that the use of Discord is appropriate in emergencies and in the transition to distance learning qualitatively activates the work of students, facilitating the process of perception and assimilation of the material.

In the second phase of the experiment (September-December 2020), we expanded the functions of the Discord platform to test the asynchronous component of the educational process to determine the possibility of integrated use of the Discord platform as a single platform for distance learning and blended learning.

During the second stage of the experiment, in addition to those already mentioned in the first stage, a number of measures were taken to test the quality of interaction between students and teachers in conditions of complete limitations in the means of conducting classes only Discord platform:

1. *Conducting the total number of classes*. During all classes, conditions were created for the simultaneous transmission of parallel broadcasts with students of I-III courses, by expanding the structure of the educational unit and constant coverage of lectures and practical materials on the appropriate channels of groups and conducting practical classes in constant open communication. The result was the confirmation of the results of the first stage of the experiment, because unlike other remote communication software, with the help of the Discord platform we managed to create conditions for uniting students and teachers in impro-

vised groups, debates between students and presentation of group and individual results. All this significantly reduced the time required for students to perceive the information, which created the conditions for intensification of the learning process in terms of distance learning.

2. *Carrying out settlement practice*. During the study, we had the opportunity to test the feasibility of using the Discord platform not only in the context of general disciplinary classes, but also a more complex process of computational practice in third-year students majoring in 122 Computer Science. Prior to the internship, students were asked about their wishes for the internship platform and according to the results it was determined that 87% of students voted for the internship based on the Discord platform, 11% supported all options and 2% voted for the internship based on the Zoom. This survey once again confirms the high level of motivation and support of students in the vector of using the Discord platform compared to other modern platforms. The result of the work was an excellent increase in the pace of work of students, relative to the results of previous years, all students coped well with the task of practice and managed to defend their work. Regarding the increase in the level of quality of work performed, we can emphasize that there is a decrease in the number of students with a "medium" level of knowledge and a rel-

ative increase in the number of students with a "high level of knowledge" (table 5). We see the reason for this trend in the group work of students in synchronous mode, students were able to support and complement each other, which significantly reduced the level of students with insufficient knowledge and expand the creative abilities of students with sufficient and high levels of knowledge. In addition, communication in a student-friendly mode significantly reduced the level of psychological stress and accelerated the time of work.

3. *Carrying out modular control.* At the first stage of the experiment, all forms of student certification were conducted on the basis of the Zoom platform, but the free form of the Zoom platform is not enough for such an event, so it was decided to conduct an experimental modular control based on the Discord platform. In general, the results fully justified the hypothesis of the expediency of using Discord, all periodic modular tests were conducted in a timely and productive manner, students did not have a high level of psychological load and in a convenient and "already familiar" format for them on the Discord platform passed periodic control and confirmed their assessments. Conducted at the end of the periodic module control stressed that 82% of students "very positively" evaluate the transition of periodic module control to the Discord platform.

4. *Session control.* As part of the experiment, it was decided to conduct a series of exams for third-year students based on the Discord platform. Before the beginning, the hypothesis about the expediency of using Discord during the examination control was determined, but after the examination control, the determined hypothesis was partially refuted. The reason for this refutation was the insufficient development of internal resources of the Discord platform to record the control. Examination in distance learning requires a complete record of the entire process of writing and defending the student's work, its evaluation and possible refinements, but the Discord platform in its free format does not allow recording the process, which required the teacher to find additional screen recording software. The solution to this problem was found in the use of Bandicam Screen Recorder and Faststone Capture software, which are shareware and do not fully solve the problem assigned to them. Therefore, at this stage of platform development, we consider it appropriate to use external platforms (Zoom, Skype and others) for session control, or additional use of screen recording software.

Table 5: The results of the calculation practice of students in 2018-2020 (%).

The level of knowledge of the student	2018	2019	2020
Average	33	28	11
Sufficient	54	66	55
High	13	16	34

Therefore, we can conclude that the experiment allowed us to mark the Discord platform as useful in terms of general educational process, organizational and educational activities, administration of educational process and periodic control, but needs to expand the functionality and additions to reporting on session control, which requires recording the process of passing the exams by the student. The conducted questionnaires and analysis of the results of students' calculation practice emphasize the presence of a high positive evaluation of the platform by users (especially students). The growing level of students motivation to use the platform and the intensification of their educational activities confirms the positive impact of using the Discord platform on the quality of students' knowledge during distance and blended learning. The presence of constant development of the platform by developers, their attitude to the problems of society in quarantine allows us to emphasize the significant constant growth of the platform and make a hypothesis about the possibility of solving the problems of the platform in the future. All this confirmed the assumption that the use of Discord is appropriate in emergencies and in the transition to distance learning qualitatively activates the work of students, facilitating the process of perception and assimilation of the material.

4 CONCLUSIONS AND FUTURE WORK

The purpose of our study was to determine the feasibility and features of using the Discord platform as an environment for creating a quality system of distance communication in distance learning during emergencies. To solve the main task of the study, we analyzed information sources on safety during quarantine activities related to the pandemic of viral diseases and concluded on the needs of users of educational services to provide a quality means of distance learning and communication in long-term emergencies. Having identified the general tasks and needs

of the online communication service, a comparative analysis of its Discord platform with Skype, Zoom and Google Meet systems was conducted. The results of the analysis showed that Discord requires much less load on the system and works with almost all operating systems. Further work revealed the features of using Discord functions to establish a quality environment for learning and reflected the results of an experiment conducted in the study, which surveyed students and teachers on the quality of the initial process. For educational activities, a system of monitoring classes and the opportunity for students and teachers to visit couples who are not part of the spectrum of their personal influence was created. This made it possible for teachers and the administration of the educational institution to check the quality of the educational process, and students had the opportunity to create their own individualized vector of education by visiting additional pairs with the permission of the teacher. Thus, a system was created to fully cover all the needs of educators to create a quality educational environment in terms of long-term distance learning. This confirmed the assumption that the use of Discord is appropriate in emergencies and in the transition to distance learning qualitatively activates the work of students, facilitating the process of perception and assimilation of the material. The experiment made it possible to mark the Discord platform as useful in general educational process, organizational and educational activities, educational administration and periodic control, but needs to be expanded and supplemented in terms of reporting on session control, which requires recording the process student exams. The conducted questionnaires and analysis of the results of students' calculation practice emphasize the presence of a high positive evaluation of the platform by users (especially students). The growing level of students 'motivation to use the platform and the intensification of their educational activities confirms the positive impact of using the Discord platform on the quality of students' knowledge during distance and blended learning. Thus, a system was created to fully cover all the needs of educators to create a quality educational environment in terms of long-term distance learning.

In further work, we consider it necessary to expand the existing functionality of the developed platform in the vector of automation of educational processes (class schedule, notification, automatic testing of students after class, creation of automated bots for conducting control tests) and conduct an experiment to identify their impact on the quality of education, in order to increase the quality education under quarantine restrictions or other man-made disasters.

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