

## **Comparative Analysis of Chatbots Constructors for Use in An Educational Environment**

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### **Abstract**

Distance learning has become the most important aspect in the educational process of higher education. The prevailing conditions encourage teachers to study and use digital learning tools. In turn, this aspect pushes developers to work with and implement new functionality in software products.

The article presents an analysis of the possibilities and costs of using messengers in an educational environment. In particular, the options for expanding their functionality (with the help of special designers) for the development of educational products are considered, as well as requirements for the creation of such tools by teachers who do not have the skills to build software at a professional level.

Using the example of Telegram, the experience of using messengers in the learning process is described: a chatbot has been created to organize the control of knowledge of students studying at a higher level of education. The original chatbot, which was developed using the Telegram API interface and chatbot designers, tests the knowledge, skills and abilities of students studying the discipline called "Robotics".

This study showed that the messenger's potential lies not only in communication between users in the form of sending audio, video, and text messages, but also in its educational capabilities.

**Keywords:** Distance education, mobile learning, Telegram, chatbot, chatbot constructor.

## **1. Introduction**

Within the framework of distance learning, which is becoming more and more in demand in modern universities, it is advisable to adapt the familiar, classical teaching methods [1]. The regulatory and legal principles of the organization of the educational process are also changing, conditions are being created for the implementation of dynamic personalized learning. The possibility of organizing such an educational process taking into account the needs of each student is normatively prescribed in Article 13 of Federal Law: "Various educational technologies are used in the implementation of educational programs, including distance learning technologies, e-learning." [2].

In our study, to classify and highlight the properties of distance learning, we used the definition proposed by E.S. Polat. Distance learning is a form of education in which all or most of the educational procedures are carried out using modern information and telecommunication technologies with the territorial separation of the teacher and students [3].

There are main types of distance learning platforms — network technologies, TV technology, case technology. These techniques are based on a different level of interactivity — educational materials are online, both participants in the educational process (teacher, student) have access to perform appropriate actions with information - processing, control, task completion, communication.

In the classical view of distance education, more attention is paid to the individual work of students than to collective work. Modern realities deal with new conditions and organized and effective communications are of paramount importance, both in everyday activities and in educational aims. Therefore, already at the stage of obtaining higher education by remote means, it is important to develop paired, group and collective forms of interaction of students. These tasks can be implemented through modern forms of distance learning, including online learning technology in the form of a forum or chat.

Online learning in the form of a chat is an approach to distance learning that makes the most of the possibilities of the Internet services, in which communication are of paramount importance (e.g. Zoom)

Such services, besides face-to-face learning, provide opportunities for contactless work. These include both passive technological solutions in the form of the ability to attach files and multimedia materials, and interactive (forums, chats). Moreover, in recent years, many services allow you to interact not only with "alive" participants, but also with use of the platform itself through bots. The created bots make it possible to facilitate the teacher's routine due to automatically generated messages during the dialogue. The area of application of chatbots and their potential in the organizing of the learning process has been revealed in numerous studies.

The developing market of network services offers both chatbots themselves and special tools for developing them without programming skills. On the one hand, this situation opens up great opportunities for teachers to create modern distance courses, and on the other hand, it disorients them, since it becomes necessary to study each service and its functionality separately.

## **2. Methods**

The article discusses the contactless distance learning in Kazan Federal University, in a situation where the teacher does not have the opportunity to conduct "face-to-face" communication with students. In these conditions, the teacher needs to use various (including mobile) services for communication with students.

When choosing network services for mobile learning, V.A. Kuklev suggests the following principles [4]:

- easy and accessible to use — the interface should be familiar to students or can be learned by them in a short time;
- free of charge — so that every student can install such an application at any time without any difficulties;
- extensive functionality that would not be inferior to the capabilities of other services or could be compensated by new ones;
- there is no need to acquire specialized knowledge in the field of information technology for the successful application of the application.

After analyzing a large number of platforms, we came to the conclusion that Telegram meets all the requirements listed above to the maximum extent.

Telegram is a cloud-based instant messaging service. Users can send messages and share photos, videos, audio and files of any type. By April 2020, Telegram has 400 million monthly active users, while at least 1.5 million new users are registered daily [5].

Telegram, as a messenger program, originally designed to send messages, has no orientation to the educational process. However, it has ample opportunities for use in the learning process. First of all, this is the organization of interaction between students during group work, as well as when creating a project, where it may be necessary to send files and photos, voice notes, create groups and channels. The main forms of training organization include:

- Groups, group chats. Multi-user groups are suitable for quickly uniting like-minded people and instant communication between them. By developing the main topic of the chat, you can create common projects, organize cooperation to achieve common goals, ask questions and get answers, have conversations and discuss something important.
- Telegram channels. It is the channels, as well as the function of creating chatbots that is not widespread for messengers [6] that make Telegram a very functional and attractive program for organizing the learning process. Channels can be used to exchange with many users at once. There are a large number of popular information and educational channels. Also, each teacher (or even a student) can create his own channel, which will become an analogue of a blog or will be designed to present the progress of project work to all its participants [7].
- Bots in Telegram. Bots are special Telegram accounts created in order to automatically process and send messages. Users can interact with bots using messages sent via regular or group chats. The logic of the bot is controlled using the Telegram API, an application programming interface that allows services to interact, access and exchange data [8].

There are numerous studies devoted to the creation of Telegram bots for different tasks. The article by R.I. Kruglik described the creation of a chatbot in Telegram using the PHP programming language [9], D.R. Filonov, V.I. Tupikin [10] developed a chatbot in Telegram to help applicants. A.D. Ivanov [11] highlighted the advantages of chatbots in Telegram and VKontakte for the dissemination of news. The article by A. M. Dasyuk, M. M. Veres [12] describes the use of the Telegram API, I. A. Orekhin developed a Telegram bot for learning English grammar [13].

To create chatbots, you need to have programming skills. It is advisable for a teacher who does not possess the relevant knowledge to use special design services. All chatbot constructors currently available can be divided into 2 large groups according to the following criteria:

- based on a visual dialog constructor;
- requiring special programming skills.

In this article, the authors have selected platforms for chatbots, the creation of which does not require special programming skills from teachers-developers. The platforms in question are constructors that can be trained to solve specific tasks.

A large number of platforms for developing chatbots can be found on the web, but it should be borne in mind that this direction is developing rapidly, new proposals and solutions are appearing on the market, and existing platforms are being finalized, significantly improving their functionality [14].

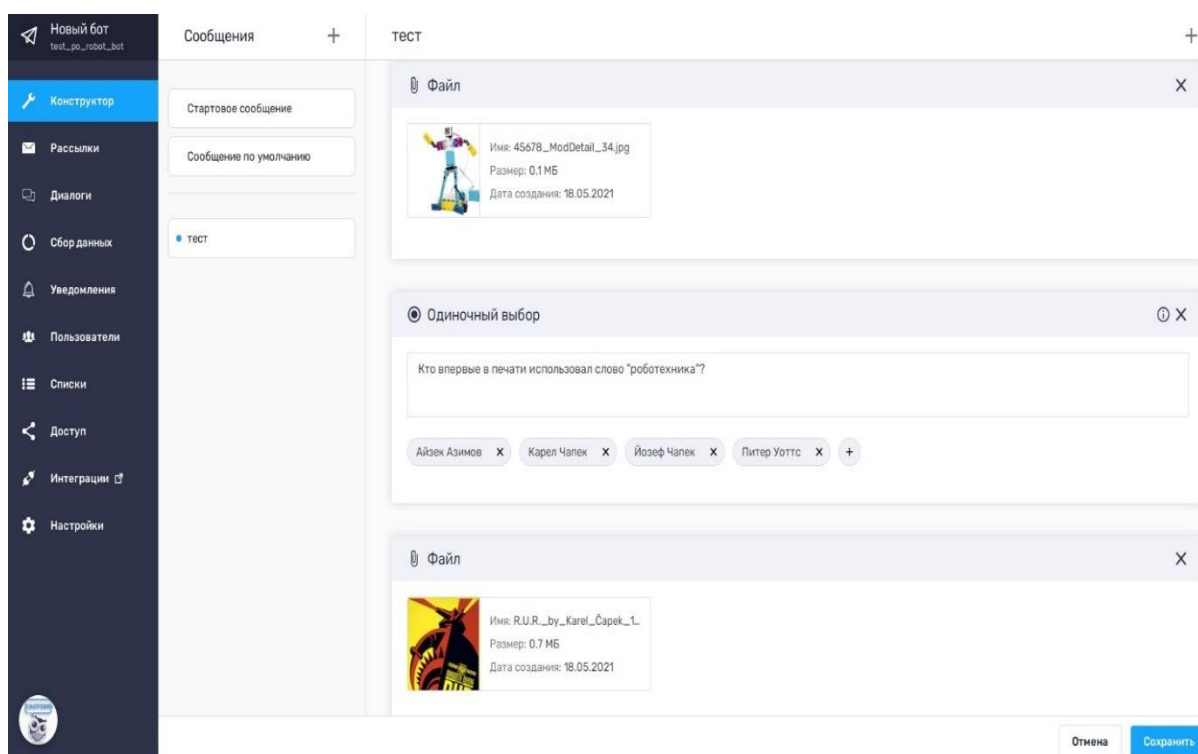
### **3. Results**

The following criteria were identified for the analysis of chatbot designers:

1. The ability to create a bot without programming skills;
2. Russian language support;
3. The possibility of building a bot with a streaming dialog constructor (the "answer-question" paradigm);
4. Free/shareware access to the constructor.

Based on the criteria and the following constructors were found and considered: Chatforma, Botmother, Aimylogic.

**Chatforma.** This constructor allows you to create only one chatbot an account. The chatbot created on the platform can be published in four network services: Telegram, Viber, Facebook Messenger and VK. Figure 1 shows the process of creating a chatbot for the Telegram messenger.



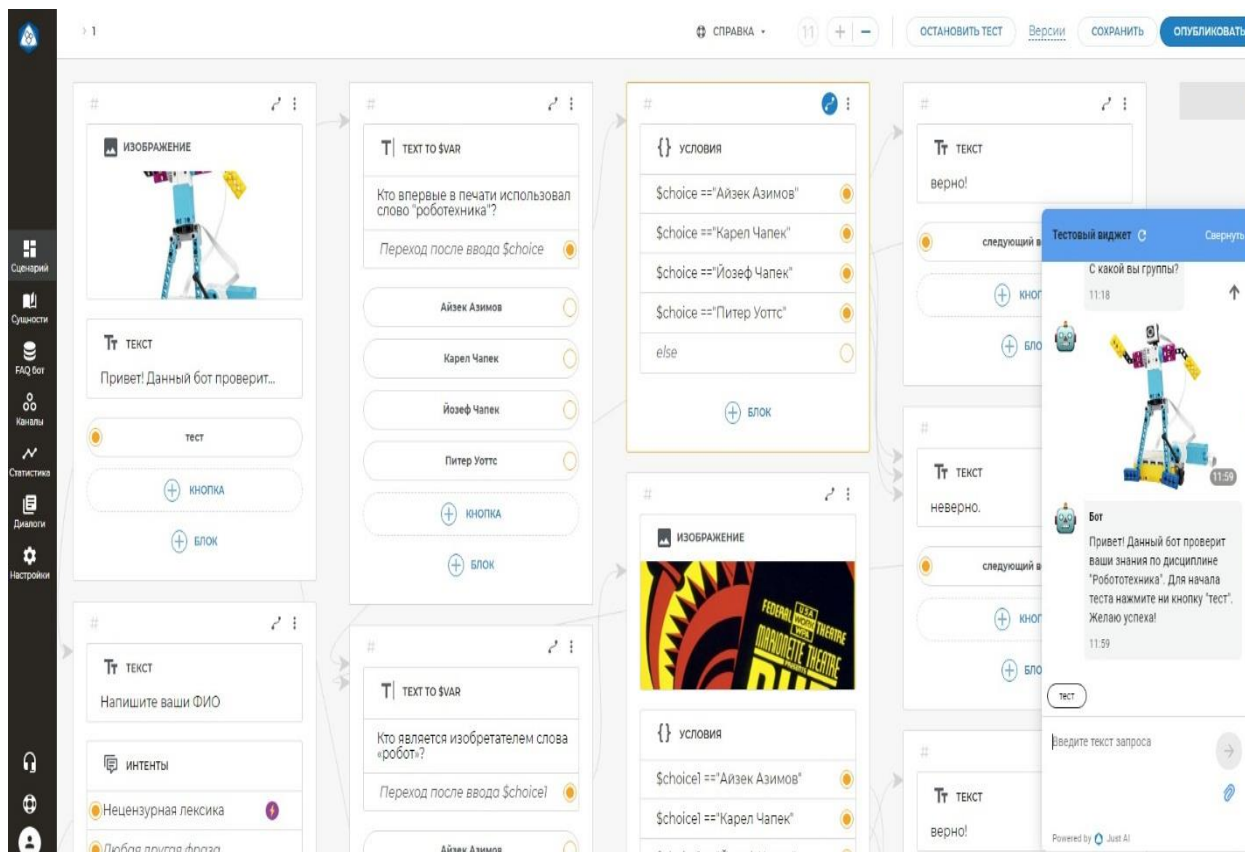
**Figure 1.** Creating a chatbot in Chatforma

## Result:

- The ability to publish bots on social networks such as Telegram, Viber, Facebook Messenger and VK.
- Free trial period for 14 days. However, it is worth noting that after the expiration of the trial period, the bot remains operational, the ability to edit the created bot disappears.
- The presence of a knowledge base (in the form of video tutorials on YouTube) and a hint system that facilitates the use of the service at the first acquaintance.
- The ability to download files, all common formats, with a size limit of up to 10 MB.
- Availability of an error protection system.
- High entry threshold: the user has to spend a lot of time to get acquainted with the interface and logic of the application.
- Linearity: the behavior of the bot is based on a linear algorithm, that is, the bot performs actions sequentially.

**Aimylogic.** This constructor allows you to create several chatbots using one account. The service, unlike Chatforma, has the ability to create bots with non-linear behavior, which actions depend on the information entered by the user. The described technology is created with the help of so-called "screens" — in them the user inserts text, image, audio, video, etc. These screens are interconnected, thus creating the structure and logic of responses to the user's request. These connections are visually drawn, thereby making it easier for the developer to understand the creation of the bot process in this constructor (see Figure 2).

The constructor provides an opportunity to test the bot not switching to the website for which it is being created. It provides an extensive list of services where you can publish a bot: Telegram, Facebook Messenger, VK, WhatsApp, Microsoft Teams, Viber, WeChat. The platform has implemented support for voice assistants: Alice, Marusya, Google Assistant.

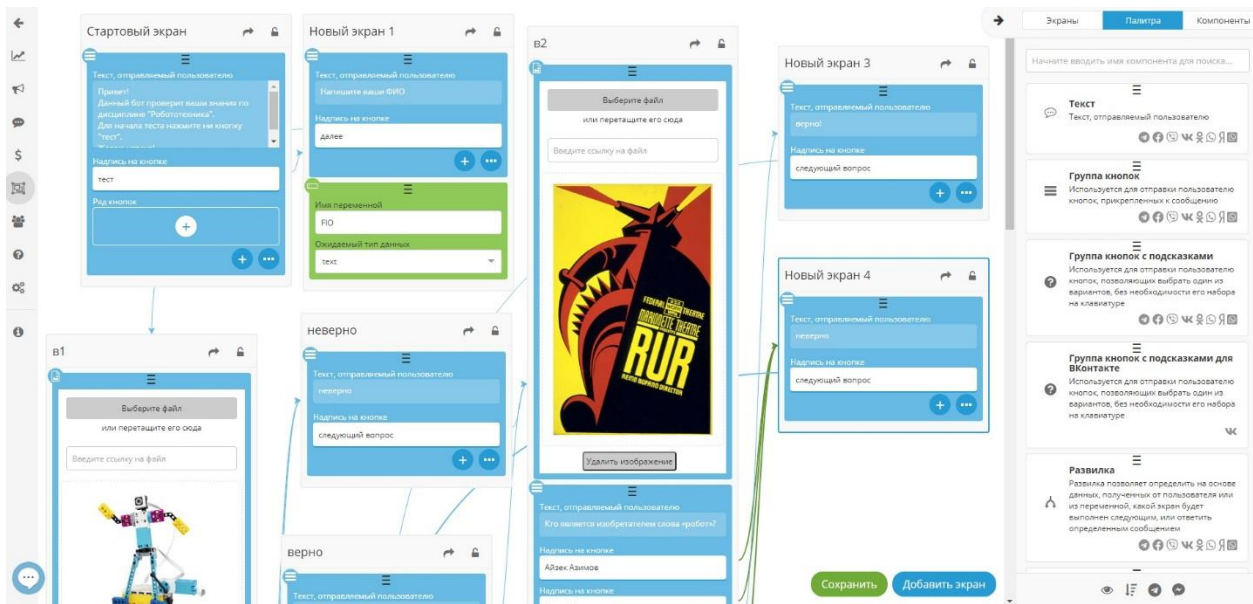


**Figure 2.** Creating a chatbot in Aimylogic

## Result:

- The ability to publish the bot in various network services.
- Free trial period (14 days) without the possibility of using the bot after its expiration.
- Availability of a knowledge base.
- The ability to download files, all common formats, with a size limit of up to 10 MB.
- The ability to embed videos from YouTube.
- Multiple bots can be created using one account.
- User-friendly graphical interface.

**Botmother.** This service is similar in capabilities to the previous constructor: the nonlinear logic of bot behavior is also implemented here, there is a graphical interface and a knowledge base similar in functionality. However, the service imposes more restrictions on their use and has a more complex interface (Figure 3).



**Figure 3.** Creating a chatbot in Botmother

## Result:

- The constructor allows you to publish the bot in the following network services: Telegram, Facebook Messenger, VK, WhatsApp, Viber, Odnoklassniki, Yandex.Dialogs
- The constructor provides a free trial period for 4 days.
- The knowledge base is hosted on the platform, but it is more complex for an inexperienced user.
- Limits on downloading multimedia files are up to 5 MB for images and audio and 20 MB for video.
- Only one bot can be created using one account.
- The designer has implemented an error protection system that warns the developer about incorrectly entered parameters.
- The interface is less friendly to the developer.

## 4. Discussions And Conclusions

Based on the results of the comparative analysis, a general conclusion was drawn up and presented in Table No. 1.

Analysis of chatbots			
Criteria	The constructor <b>Chatforma</b>	<b>Botmother</b>	<b>Aimylogic</b>
social media	VK, Telegram, Viber, Facebook Messenger	Telegram, Facebook, VK, WhatsApp, Viber, Odnoklassniki, Yandex.Dialogs	Chatvidget, Telegram, Facebook, VK, WhatsApp, Microsoft Teams, Viber, Chat API, WeChat, Alisa, Marusya, Google Assistant
free trial period	14 days	4 days	14 days
quantity of bots an account	1	1	>1

the base of knowledge	there is, in the form of video tutorials on YouTube and prompt at first use	yes, it is located on the same site as the constructor, but it is difficult for an inexperienced user	there is, located on the same site as the constructor, the material is presented in an accessible language
multimedia file formats and their maximum size	pictures: .jpg, .png, .gif; 10 mb; files:.doc, .xls, .pdf; 10 mb.	pictures: .png, .jpg, .jpeg.; 5 MB; audio: .wav, .mp3, .ogg; 5mb; video: only links for .mp4; 20 mb.	pictures: .jpg, .png, .gif; 10 mb; audio: .wav, .mp3; 10 mb; video: only links to YouTube.
user interface	a small number of tips, you need to spend time to familiarize yourself with the platform	a well-developed system of visual prompts	the interface is friendly to the developer, the connections between the screens are visually displayed
if the bot is designed incorrectly, does it report an error?	if an error occurs, the message is displayed only when saving and indicates exactly where it occurred	if an error occurs, a message is displayed, but the incorrect section is not specified	if an error occurs, a message is displayed, but the incorrect section is not specified
The possibility of testing in the constructor itself?	no	no	yes

**Table No. 1.** Analysis of chatbots

Based on the above analysis, we came to the conclusion that the most suitable constructor for a teacher-developer today is the *Aimylogic* platform. In addition, an important advantage of the platform is the ability to create a chatbot on the Microsoft Teams platform, at the moment using by Kazan Federal University in the process of distant learning.

## 5. Acknowledgements

This paper is performed as part of the implementation of the Kazan Federal University Strategic Academic Leadership Program.

## Bibliography

- A.Danilov, L. Salekhova, N.Tursunova, N. Anyameluhor, “Digitalisation Trends and Blended Learning Visualisation in Modern Digital Education“ //International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, vol.9 Issue-1, pp. 5109-5111, 2019.
- Federal Law No. 273-FZ of December 29, 2012 “About education in the Russian Federation” (editorial from 24.04.2020) // SPS Garant.
- E. Polat, “Theory and practice of distance learning”/ E.Polat, M.Bukharkina, M.Moiseeva — M.: Publishing center “Academy”, p. 416, 2004.
- V. Kuklev, “Formation of a mobile learning system in open distance education”: dissertation of the doctor of pedagogical Sciences: 13.00.01 / V. Kuklev - Ulyanovsk, p.515, 2010.



- 400 Million Users, 20,000 Stickers, Quizzes 2.0 and €400K for Creators of Educational Tests — 2020. [Electronic resource]. URL:<https://telegram.org/blog/400-million?ln=f> (date of request 06.05.2020).
- Messina Chris. 2016 will be the year of conversational commerce // A Medium Corporation — 2020. [Electronic resource]. URL:<https://medium.com/chris-messina/2016-will-be-the-year-of-conversational-commerce-1586e85e3991> (date of request 06.05.2020).
- Telegram Homepage — 2020. [Electronic resource]. URL:<http://telegram.org> (date of request 06.05.2020).
- Telegram Bots FAQ — 2020. [Electronic resource]. URL:[://core.telegram.org/bots/faq](http://core.telegram.org/bots/faq) (date of request 06.05.2020).
- R. Kruglik, Creating a chatbot in Telegram // The postulate of the Amur state University. Sholom Aleichem (Birobidzhan) [Electronic resource]. URL:<http://e-postulat.ru/index.php/Postulat/article/view/2839/2883> (date of request 10.05.2020).
- D. Filonov, V. Tupikin, “Chatbot for Telegram to help applicants” // Notes on computer science and mathematics Collection of scientific articles. Yaroslavl, pp. 152-156, 2017.
- A. Ivanov, Chatbot in Telegram and Vkontakte as a new news distribution channel // Bulletin of the V. N. Tatishchev Volga state University, vol. 1, № 3, pp. 126-132, 2016.
- A. Dashuk, M. Veres, “Verification system of task solutions with telegram API” // Scientific Outlook for the future, Odessa, vol. 1, № 14 (14), pp. 41-46, 2019.
- I. Orehin, “Telegram bot in English” // Information technologies in the modern world, Yekaterinburg, pp. 119-122, 2017.
- N. Antonenko, A. Babaev, A. Ekaterinichev, E. Natashkina E., “Comparative analysis of popular platforms for creating a chatbot” // Information Technology. Problems and solutions, Ufa, № 3 (12), pp.121-125, 2020.