

# Designing a chatbot for learning a subject in a Telegram messenger

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**Abstract.** The article deals with Telegram messenger as a tool that can be used for educational purposes, namely, for studying the academic discipline. The essence of the concept of messenger and statistics of its use in the world are clarified. Popular messengers such as WhatsApp, Viber and Telegram are compared, as well as their technological capabilities and potential for use in learning activities. The advantages of Telegram Messenger and requirements for the software product (chatbot) were highlighted.

In the Telegram environment there was developed a chatbot for studying the educational discipline "Informatics" for the students of vocational education institutions. It was developed and described the stage of its development: creating a token API in BotFather, adding a new bot in ManyBot, as well as adding commands and responses to them, with a demonstration of illustrations. The final result of the chatbot is given, which contains such common divisions: lectures, lab, and homework.

An experimental study to test the effectiveness of using the chatbot in the learning process is made, which describes its implementation in the learning process on the example of the subject " Informatics " and conclusions about the relevance of its use in the learning process.

**Keywords:** Messenger, telegram, educational discipline, chatbot

## 1 Introduction

**1.1 Formulation of the problem.** Nowadays, information technologies have penetrated all spheres of life and activity of people. And the activity of a teacher and students is no exception: electronic document management, work with an electronic journal, preparation of materials for students (cards, tasks for independent and control work), training presentations for classes, as well as a significant number of methodological and training materials in electronic form, and others. Electronic learning resources are easy to use, have built-in search and navigation capabilities, and are compact and can fit in any mobile device [1].

With the rapid development of mobile learning technologies, including phones (smartphones) tablets, etc., and the ease of access to mobile Internet, as well as the rapid development of mobile software applications for the period 2017-2018r. in Ukraine have gained popularity Messengers. According to research results, 91% of smartphone owners use Messengers [2]. With the help of these Messengers, users can exchange messages, files, photos and video materials, and it allows using the functions of Messengers in education.

One of the main tasks of the education sector is to improve and develop the learning process. In the current realities, this task cannot be done successfully without introducing new mobile technologies into the learning process. Given the popularity of instant Messengers at all ages and their large volume of functions, it will be advisable to use them in educational activities.

**1.2 Analysis of recent research and publications.** The use of ICT in the educational process is considered in the works of Hotko O., Chaikovska O. [3], Rebenok V.M. [4]. Mobile learning technologies were considered by Tsidilo I.M., Tereshchuk S.I. and others [5], Zolotareva I.O. [6], Voichenko O. [7], Silberman M.A. [8]. Intellectual technologies in teaching were investigated by Tsidilo I.M. [9]. In the work of Matveev N.Y., Zolotaryuk A.V. [10] described the use of Telegram chatbots in different spheres of life; the prospects of using chatbots in higher education were investigated by Firsova E.A. [11]. Shyshkina M., Spirin O.M.[12] studied quality evaluation ICT.

It should be noted that the design of the Telegram chatbot for the study of academic discipline in the Telegram Messenger is a new direction of research and requires further development.

**1.3 Goal.** To substantiate the advantages of using the Telegram Messenger capabilities in the educational process, to design and experimentally test the efficiency of using the "Informatics" chatbot for students of vocational education institutions.

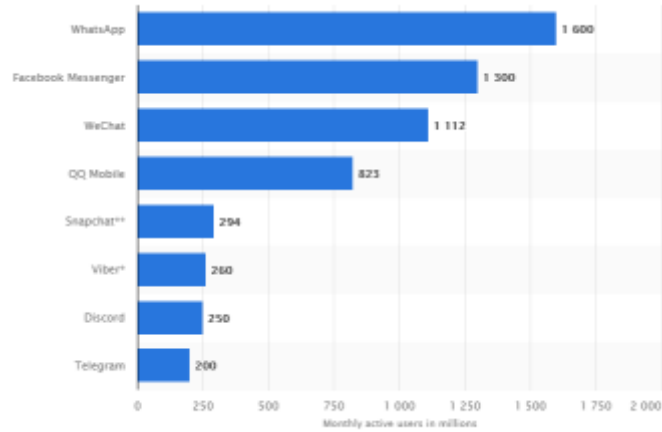
## **2 Presentation of the main material**

### **2.1 Telegram among other Messengers**

Messengers are instant messaging tools such as messaging, audio and video, photos, location, and more.

The most popular Messenger is WhatsApp, which is owned by Facebook, the leader of social networks. Over the course of 2018, the number of active Messenger users has reached over 1.5 billion users and is growing rapidly. According to a study [13] conducted in April 2019 (see Figure 1), Facebook Messenger is the second largest user

by WhatsApp. WeChat, QQ Mobile, Snapchat, Viber, Discord and Telegram share the following positions.



**Fig. 1.** The number of active users in the most popular Messengers

It should be noted that the Messengers themselves are different from each other, but they have many things in common. They are all intuitive, with the help of them you can chat from any part of the world where there is internet and gadget connection, there are group chats. Most support channels that publish news on a variety of topics. To use one or more Messengers in the learning process, it is necessary to make a comparative analysis of their technological capabilities and potential and describe their differences.

In our opinion, it will be advisable to compare the most popular Messenger in the world WhatsApp, the leader in Ukraine Viber [14], and Telegram, in our opinion, as the most promising one. For comparison, the main 4 criteria were identified:

- General information
- Users
- Contacts
- Security

In the general information (see Fig. 2) we have identified the following comparison criteria:

- PC accessibility (allowing users to use the application on their computer)
- Show ads (in-app advertising can be distracting and compelling)
- Free application (possibility to install the application for free)
- Personalization (ability to change background, color)

	WhatsApp	Viber	Telegram
PC accessibility	+	+	+
Show ads	+	-	+
Free application	+	+	+
Personalization	+	-	+

	4/4	2/4	4/4
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**Fig. 2.** Comparison of general Messengers information

The criterion “Users” (Fig. 3) contains the points for comparison:

- Access the application by password (possibility to set password to Messenger)
- Two-factor authentication (dual password verification)
- The size of the starting files
- Cloud file storage (when deleting information, it can be restored from cloud storage)

	WhatsApp	Viber	Telegram
Access the application by password	-	-	+
Two-factor authentication	+	-	+
The size of the starting files	64mb.	200mb.	1500mb.
Cloud file storage	-	-	+
	1/4	0/4	4/4

**Fig. 3.** Comparing Messengers by Users

Figure 4. shows a comparison of Messengers on the criterion "Contacts", namely:

- Bilateral rejection function (before receiving a message from a stranger, the user can reject the message)
- Use GPS to meet people (you can see who is nearby, making it easier to meet people)
- Phonebook contacts integration (ability to contact phonebook contacts)
- Maximum length of voicemails (ability to send long voicemails)

	WhatsApp	Viber	Telegram
Bilateral rejection function	+	-	+
Use GPS to meet people	-	-	+
Phonebook contacts integration	+	+	+
Max. length of voicemails	15 min.	30 sec.	60 min.
	2/4	1/4	4/4

**Figure 4.** Comparison of instant Messengers on the criterion "Contacts"

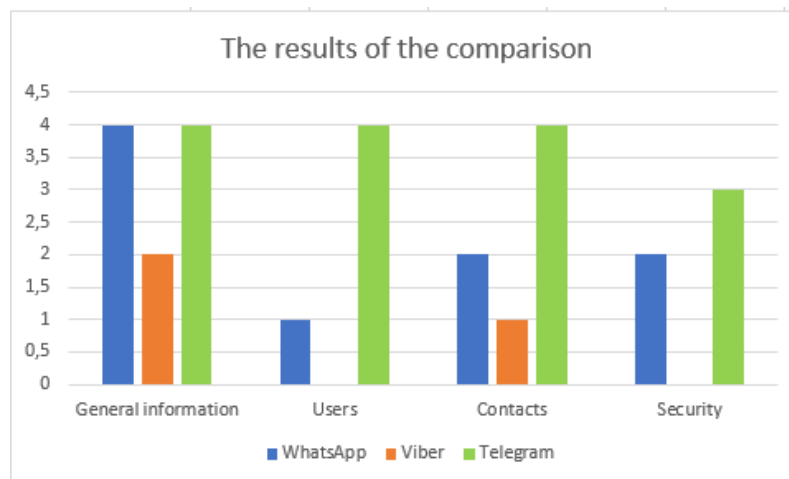
Security is one of the main characteristics of Messengers, so the following points have been identified for the equation (see Figure 5):

- Two-way encryption (protects data and ensures that only the recipient can access the information).
- Presence of privacy setting (the ability to set content so that it is not all available for public viewing).
- Possibility of anonymous use.

	WhatsApp	Viber	Telegram
Two-way encryption	+	-	+
Presence of privacy settings	-	-	+
Possibility of anonymous use	-	-	+
	2/3	0/3	3/3

**Fig. 5.** Comparing Messengers by Security

Based on the survey, WhatsApp scored 9 points, Viber 3 points, Telegram 15 points. On the graph (see Fig. 6) graphically shows the strengths and weaknesses of Messengers.



**Fig. 6.** Comparison results

As the review of modern Messengers, they are an important part of modern communication in the network. Users prefer convenient, cheap and fast communication, so choose instant Messengers. Of course, there are a large number of applications of this type, however, Telegram has the highest growth rate of the number of active users, it is the most functional and relevant for use as a means of training.

Distinguishes Telegram from other Messengers and the possibility and simplicity of creation of bots and channels with different by assigning functions. Through which you can get reminders, pass tests, download materials, study in your free time.

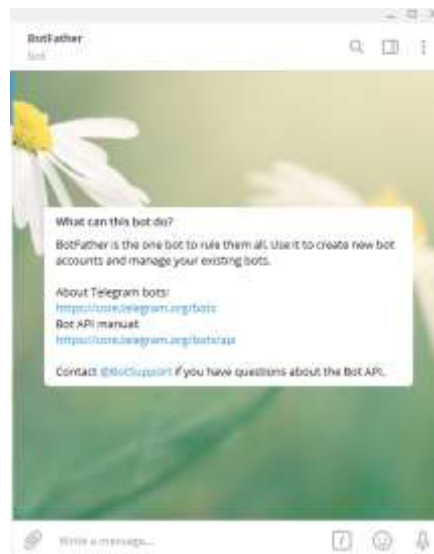
## 2.2 Designing a Chatbot on the discipline of "Informatics"

Using the chatbot function in Telegram, the task is to design and develop a software product (chatbot), in a Telegram environment with which one might consider theoretical materials, homework, view performance examples and to find a task to laboratory work on the discipline "Informatics".

Let us select the basic requirements that have been delivered to the software product (chatbot):

- Chat bot should disclose the essence, to cover the basics of the course "Informatics";
- The material should be as clear as possible;
- The interface of the developed product should be adaptable and convenient in viewing not only on the computer, but also on mobile phone (smartphone);
- Availability of self-control;
- The chatbot should contain laboratory work and homework assignments.
- The software product must be intuitive and contain useful links.

Before you create a bot, you need to register it in BotFather. This is done in order for the bot to work in the Telegram. BotFather- this is also a bot, find it simply, it requires the search menu write BotFather and find it in the list. Further you need to press the bottom button "run" (Fig. 7).



**Fig. 7.** Registration In Botfather

The Chat window displays all the available commands. We are interested in /Newbot. You can enter it manually or click on the appropriate entry directly in the command list. BotFather will ask you to choose a name for your future bot. Enter arbitrary.

Next, you need to come up with username Botu. It should be unique, because otherwise registration bot will be rejected. At the end of the name must be specified box \_bot.

After successful registration, the BotFather will send you a message with the token, which you need to record somewhere in your own and save. In the future, we will need it.

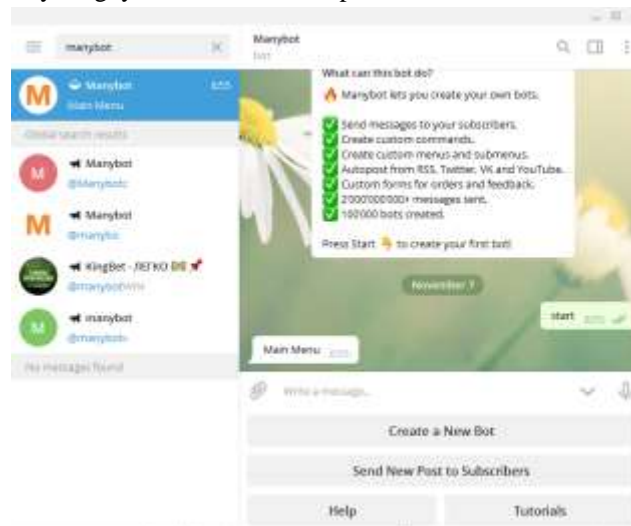
Now registering a bot in the BotFather is crossing to the creation of the bot.

ManyBot is a unique development in Telegram that allows users without knowledge of programming languages to create their bots.

To create your bot run a ManyBot, the principle of launching a similar botfather, click on the button "Add a new bot" (Fig. 8).

Then copy the previously obtained token in BotFather and insert into the chat with ManyBot. Click on the arrow to send the message to the right or Enter.

Now you need to write a little text about what our bot will do. In case you do not want to write anything, you can use the "Skip" button.



**Fig. 8.** Adding a new bot to the Manybot

The next step click on the "Run", immediately opens a window where a list of commands is displayed, and at the bottom of a convenient menu to add functions to the bot. Click on the button "custom Commands" and then "Create a command". The name of the command is arbitrary, but that it is then understood, what it corresponds to. Before the team, make sure to specify the slash.

After writing a command, click Enter or the blue arrow on the right. Now you need to add what we want the bot to send to the user in response to the command entered. For example, some text or picture, document or audio file.

However, the manual command to enter is inconvenient each time, so you can use the Create graphical menu function in ManyBot. To do this, go back to the section

"Custom Commands" and click on the button "Configure a goal. menu. Then click on the button "Add menu item". Choose in the menu created by us command. Enter the name of the menu item. For example, "lectures". You can use *Emodji*.

Press Enter or on the arrow on the right. You see a message that the command was successfully added to the menu. Return with the corresponding button (2 clicks).

The menu now has a button added by us, which is fixed by the established command.

Thus, the functionality of the T-Bot is formed. The final result on the Fig.9.

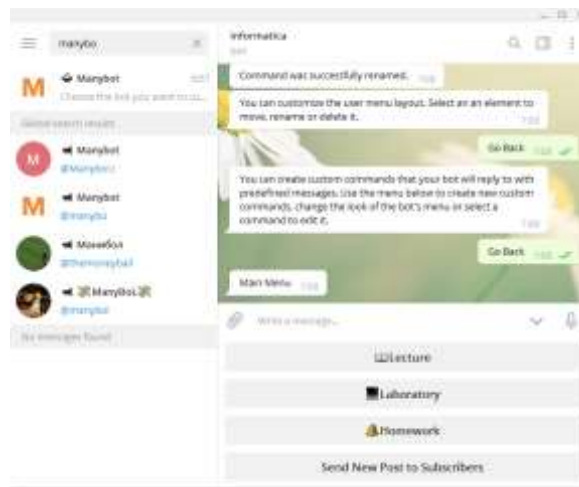


Fig. 9. Ready Chat bot for the subject "Informatics"

### 2.3 Experimental verification of the effectiveness of the use of the chat bot in the learning process

To check the effectiveness of chatbot usage during training, namely: use of the chatbot made for the subject "Informatics", was carried out by experimental research at Chortkiv Pedagogical College named after. Barvinskyi. In particular, in group 45 on the subject "Informatics" was conducted in the III stages of the experiment, which included:

1. **The first step is:** conducting a conversation, acquaintance, and informing for students and teachers, namely: installation of Messenger Telegram, connection of the chatbot, and use of its functions.
2. **Experimental work:** The use of chatbot in the educational process and, for the subject "informatics".
3. **Result analysis:** summarizing by survey.

During the experimental work, students had 2 class in the subject "Informatics", which studied the topics: "Information model. Stages of solving problems on a computer " and " Creating algorithms using US and pseudo code ". It should be noted that from 1 class of our experiment, all students had a Telegram Messenger installed and all students and teachers were connected to the created bot.

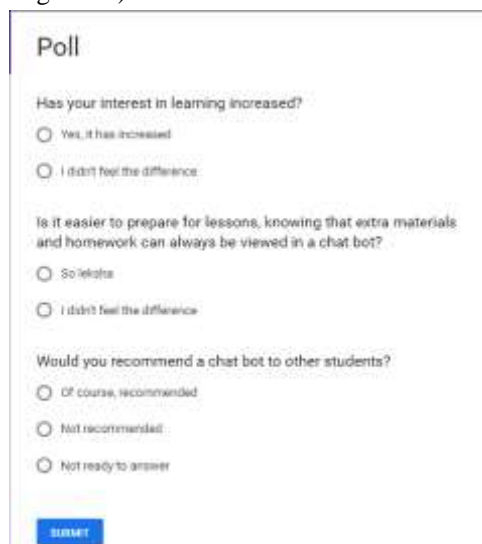


The first class was attended by 10 students from the I subgroup, and 11 students from the II subgroup, 3 were absent. The teacher was explaining a new topic, showing a presentation, the students were mostly taking notes in a notebook. At the end of the class the teacher from his laptop sent a bot to the "Lecture" presentation on the topic, and to "Homework" homework. Students clicking on the team received relevant information. Also in the next class in the calendar, there should be laboratory work. The teacher added lab work to the Laboratory menu, and warned students that they could familiarize themselves with the lab work at home through a chatbot.

It was fun to watch the result for the next class because all students have the opportunity to get acquainted with and even to start doing the laboratory work on their own, to make it easier to do it in class, as well as for missing students from the first class, whether they have mastered the material and what are in them will be the results of laboratory work.

On the 2nd class there were 2 students were not on the previous class. The teacher handed out lab work assignments, the students sat down at the computer and began to do the work. The very first thing the teacher noted was that there were almost no questions at the initial stage of the work, and the questions came only near the end of the work. Two students of "Honors" completed the work in the middle of the lesson, the teacher gave them additional tasks, most of them coped by the end of the lesson, including those students who were absent for the last class. When a teacher asked students or assisted you with a chatbot in learning new material and learning about lab work, students responded positively.

After a week of experimental research, students were interviewed on the Google Forms platform (see Figure 10).



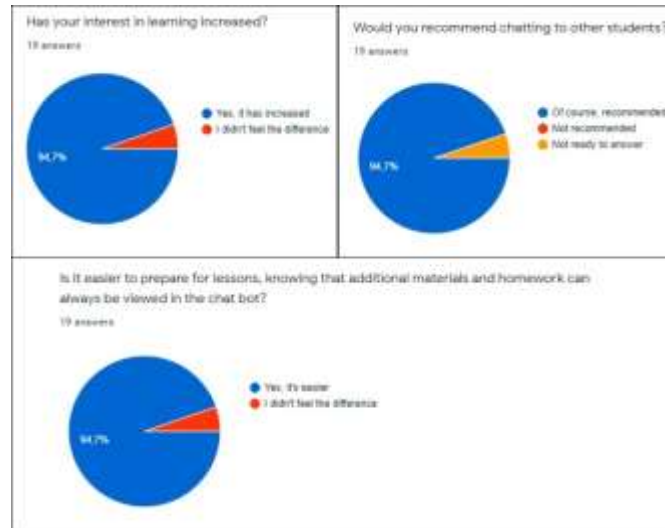
The image shows a screenshot of a Google Forms poll. The title is "Poll". There are three questions, each with radio button options:

- Question 1: "Has your interest in learning increased?"
  - Yes, it has increased
  - I didn't feel the difference
- Question 2: "Is it easier to prepare for lessons, knowing that extra materials and homework can always be viewed in a chat bot?"
  - So/ok/ok
  - I didn't feel the difference
- Question 3: "Would you recommend a chat bot to other students?"
  - Of course, recommended
  - Not recommended
  - Not ready to answer

At the bottom of the form is a blue "SUBMIT" button.

**Fig. 10.** Student Survey

According to the survey (see Fig. 11) 94.7% of students noted that they have increased interest in learning and it became easier to prepare for the classes. They would recommend using a chatbot for other students as well as 94.7% of respondents.



**Fig. 11.** Survey Results

For example, the use of the Messenger for the subject "Informatics" is the opportunity to use it for each training subject separately or in a general training chatbot. Each teaching-dacha can create a separate chatbot for its subject and add all students of the group. After the class, as a reminder, the teacher sends the text of the homework in the chatbot. The teacher may refer to literature or upcoming conferences on the subject. Students can send tasks to the chatbot, at the same time getting acquainted with the work of colleagues, or, conversely, not to see them - depending on the type of homework. Training can be conducted and completely remotely, without full-time classes. Convenient to use during quarantine when students do not attend class and receive assignments via chatbot. The main function of the Telegram may be to send a course message and then collect and verify the completed homework.

### 3 Conclusion

Undoubtedly, mobile education is playing an increasing role in the modernization and improvement of Ukrainian education. That is why Ukrainian educational institutions should focus on improving the provision of educational services by gradually integrating mobile learning technologies into the educational process. Telegram is a convenient free communication tool for students and teachers that will accelerate and simplify their interaction. Students will be able to take home lectures,

view homework, and share with others on Telegram on the way home. As the pilot study showed, students are interested and ready to use the chatbot to study the course.

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