Development of online learning media based on Telegram Chatbot (Case studies: Programming courses)

M I Ardimansyah\textsuperscript{1,*} and M H Widianto\textsuperscript{2}
\textsuperscript{1}Department of Software Engineering, Universitas Pendidikan Indonesia, 229 Dr. Setiabudi Street, Bandung 40514, West Java, Indonesia
\textsuperscript{2}Informatics Department, School of Computer Science, Bina Nusantara University, 9 K.H. Syahdan Street, Jakarta Barat 11480, Jakarta, Indonesia

*iqbalardimansyah@upi.edu

Abstract. The Covid-19 pandemic has affected various aspects of life, one of which is education. In some certain areas, at this time the government has issued an interim policy that education provider institutions such as college, schools and its kind to conduct learning activities from home. The existence of this policy makes a change in learning patterns that are usually face-to-face to being forced to apply distance learning methods (online learnings). The limited internet quota, space and time during online learning, as well as different levels of understanding of each student make teaching methods with question and answer also hampered. The solution to that problem, we propose online learning media using Telegram Chatbot. The purpose of this research is to make the Telegram Chatbot as an online learning media with case studies of programming courses, so that be expected students can get learning with the way questions and answers about programming that can be accessed anytime and anywhere, without having to always tied to the educator. The Telegram Chatbot development method using the Prototype Method which is divided into three main stages, which are (1) system requirements analysis, (2) system design and development, and (3) evaluation. The result of our propose development can be an alternative as media learning.

1. Introduction
The Covid 19th pandemic is still plagued in many countries, not least Indonesia. This situation certainly has an impact on various aspects, one of which is the education aspect. Once issued the decree of the Ministry of Education and Culture (Kemdikbud) regarding enforcement of learning at home, all circumstances be changed both the educators and students in the process of learning.

Changes in learning patterns that were originally face-to-face in class, at this time educators and students are required learning at home using distance learning methods (online learnings). This spurs educators and students to be able to quickly adapt to existing changes.

Online learning is a form of learning that utilizes communication and information technology such as the internet. In the current online learning process, there are many learning strategies that can be used by educators and students, both direct virtual face-to-face learning (synchronous) such as Live Online and indirect (asynchronous) such as Video Streaming, Podcasts, and etc.

The learning policy through the online learning method is a huge benefit for students in the era of digital technology. However, in online learning, there are still many obstacles faced by educators and
students such as limited internet quota, space and time during online learning, as well as different levels of understanding of each student.

To solve the problems previously described, in this research we propose the development of an online learning system using chatbots through the telegram application platform. The propose is expected to be an alternative learning media that can support the performance of educators in the teaching and learning process that can be accessed by students anywhere and anytime.

In several previous studies such as Qamar and Riyadi testing the effectiveness of blended learning using the telegram application, in his research it shows that the learning process using the telegram application tends to be active and the response of students in general has a good level of understanding [1]. As for the study of telegram chatbots, Parlika and Pratama state that the use of telegram bots can support interactive learning activities because the response system is realtime to automatic [2]. Ch’ng et al. in his research presented and implementation telegram bot to handle Frequently Asked Question (FAQ) from students about compulsory internship course [3]. As for other ideas from Santoso et al. providing the telegram bot as consultation services and information for the students [4] and also ever implemented by Setiaji and Paputungan, Utilizing telegram bot for dissemination of campus information [5].

Chatbot is a program in artificial intelligence designed to communicate with humans as its users. The reason for the selection of applications telegram itself because this application is one of instant messenger that is most widely used at this time [6], in addition to the simple and flexibility that can be used in a variety of devices. Applications telegram according by Mansoor [7] also has a consumption of internet data most lower than other instant messengers.

2. Materials and methods

2.1. Development
According KBBI, development means the process, method, action to develop [8], while according Seels and Richey referred to by Sumarno said that development means the process of outlining the design specifications in the form of features [9]. Development here is an effort made in achieving a better goal.

2.2. Online learning media
Online Learning is an information and communication technology that enables students to learn anytime and anywhere [10]. Meanwhile, according to Michael, online learning is learning that is structured with the aim of using an electronic system or computer so that it is able to support a learning process [11]. So it can be concluded that Online Learning Media is an Online Learning Media Facility using electronic system devices such as computers, smartphones and the like that can be accessed without time and location limits.

2.3. Telegram application
Telegram is a one of instant messaging service application based cloud which allowing users to send multimedia messages, make voice and video calls [7] over the internet. The telegram application has many advantages compared to other instant messengers such as better privacy features, open source, unlimited storage and others.

2.4. Chatbot
According Patel et al., chat bot is bot program that respond with the user in natural language just as a human would reply [12]. Meanwhile, according to Imamah and Dores said that Chatbot is a program in artificial intelligence designed to be able to communicate directly with humans. Although many bots are able to interpret and respond to human input, the bots actually meant just the keywords in the input and respond with the most appropriate key words, or patterns of words that are the most similar of the data already exists in the database that was created earlier [13].
2.5. Research methods
This research uses a prototype model, the characteristic of this model can support the implementation research. According to Pressman and Maxim, this method is suitable for developing research application that will be redeveloped [14].

Prototype model goes through three processes, namely collection of needs (system requirement analysis), designing, and prototyping evaluation. The repetition of these three processes continues until all needs are qualify. The result are made to satisfy and understand needs better. The process of prototype mode illustrated in Figure 1.

![Figure 1. Research methodology: Prototype model.](image)

3. Results and discussion

3.1. The architecture of online learning media based on Telegram Chatbot system
Here we propose prototype system architecture which is described in Figure 2. The architecture of the online learning media Telegram Chatbot system involves 3 main elements, namely 1). Educators as a learning resource; 2). Telegram application as a bot or agent; 3). The students as users, recipients of learning.

![Figure 2. The architecture of online learning media based on Telegram Chatbot system.](image)

3.2. Development online learning media based on Telegram Chatbot system
The case study in this research is for online learning with topic the Basic Programming course. In Telegram Chatbot development, we used the Telegram bot through the @BotFather account. The Telegram bot created is named "RPL Course", where this bot will provide information to students about matters related to the material in the Basic Programming course.

Bot "RPL Course" is divided into system design for bots and system design for databases. The Telegram Chatbot system design is built using a database through the Apps Script with the JavaScript programming language.
3.3. Testing online learning media based on Telegram Chatbot system

Previous users (students) have added bot as friends, as shown in the Figure 4. Then, in order to start a conversation, the user enters the command "/start", then the bot will display a welcome message, as shown in the Figure 5. After successfully testing "/start", the user can display a list of commands by typing the "/" sign, as shown in the Figure 5. From the menu list test above, it is found that the "/" command can display the entire command along with its explanation. Then proceed with testing the command "/materi1", as shown in the Figure 6. Based on the above test, command "/materi1" can display one of the definitions in the programming basics.
An analysis of the performance of the system has been conducted, as shown in Figure 6. Our Telegram Chatbot system can send that information to the requested user based on data or material that has been collected from the database.

4. Conclusion
Online Learning Media based on Telegram Chatbot can be an alternative media learning process at this time. Educators and also students can make the teaching and learning process more interactive, flexible and have unlimited access to location and time. With the Telegram Chatbot students can repeat the learning that has been explained previously without having to be accompanied by educators, this is beneficial for students who do not focus on online learning with mode synchronous.
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