BCNPYLIB CHAT BOT: The artificial intelligence Chatbot for library services in college of nursing

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Abstract— **Although in the present, there is email notification, a posting, and a phone notification that connect directly with the user, they are insufficient to keep the user interested, which becomes a problem impacting the service users' library satisfaction. The user eventually forgets what they have been told since they likely tend to just skim through a notification [1]. The researcher experimented with using AI technology to answer questions from library users via the LINE application in order to meet their requirements and improve the quality of library services. Regarding AI technology, when users text a message that matches the response requirements, it can answer the user's questions about the location of the book, book categorization, opening hours, and other relevant questions, which frees up the librarian's time to focus on other tasks. AI answering services can gather users' requests and utilize them to enhance the development of answers. Users can also interact with the system without time limitations since AI technology is always acting as a librarian [2] to meet user satisfaction. In regard to the BCNPYLIB CHAT BOT experiment, it was discovered that the satisfaction assessment results encouraged learning (libraries), which led to an improvement in the quality of library service management. A library subtopic and an assessment list of "consistent notification of information related to the service, new activities, and information resources of the library" demonstrated a significant increase of 0.45 percent among nursing students in years 1-4 and nursing teachers, leading to the development of the quality of library service management. The developed system will contribute to user satisfaction with the library's services in the future**

Keywords—artificial intelligence, chatbot, library services

I. INTRODUCTION

Libraries are generally responsible for providing information services in accordance with policy, goals, and organizational structure by offering basic services and other services in a variety of forms and having easy access to information resources [3]. The most popular app used by Thai people is Facebook, followed by LINE. A smart notification system is a notification sent to users who will receive notifications. The system will function with PC applications as well as mobile electronic device apps, the majority of which are available as applications on Internet-connected mobile electronic devices. The notification will be provided to the user instantly or at the time specified by the service provider. It will be shown in the form of a brief message informing them of the communication channel, who is using it, and what important information is being communicated. The user may tap to open the notification, and if they ignore it, they can reopen the communication channel and see the notification again. Additionally, users can choose to turn on or off notifications. Smart Notifications focus on real-time communication with users to make it easier for service providers and to assure that users are informed.

According to the research of smart notification systems, smart notification can properly be used to address issues with System Union Library Management BCNPL LIB software in the Boromarajonnani College of Nursing library, Phayao Province, Thailand, because it provides distinctive features that include quick information notification and convenient access to the library's online services. Furthermore, the system is compatible with service providers' service usage systems. The LINE chat application (LINE Messenger) is the third most popular application in Thailand, with a variety of users. It has been used to publicize information about Boromarajonani College of Nursing, Phayao by informing users via the LINE Messenger application, mostly because users are acquainted with the application's use. In the application, users can send messages, pictures, video clips, and audio to others, both in private or group chats. When a user sends a message, the application notifies the user of the sender's name. Users of the application can change notification settings such as notification sound, text message notification, and vibration alert. Notifications are represented in the application by a symbol that appears when the user runs the application, even if the user has turned off notifications.

II. RELATED WORK

To ease the burden on teachers who have repeatedly answered the same or similar questions from students, [4a] the research proposed the use of the Chatbot feature on instant messaging (Telegram) to handle all questions. Natural language processing modules in the Chatbot understand learners' questions regarding study materials and match them with predefined answers. It can be used as a data collection tool to create a database of questions, at which point it can be used to improve the functionality of the chatbot. In terms of observation and findings, it was revealed that a Chatbot is a useful tool for providing information to learners and may potentially answer a wide range of questions.

A. Application Line

LINE is a chat application for communication that allows users to communicate by typing messages from one device to another [5]. NHN Corporation is currently developing services in a variety of fields such as business, news, education, and other areas of daily life that work across several platforms. LINE Messenger is a free messaging app that allows users to send messages as well as make audio and video calls [6]. It is available for iOS, Android, personal computers, and Mac OS. Moreover, the application can send text messages, still images, sounds, animations, small

pictograms (icons), cartoon characters, and artist images with a short message, and may contain sounds and animations (Line Sticker) [4b]. It can also make audio and video calls, and users may use LINE to manage group contacts and set up group chats.

B. LINE Official Account

It is a LINE official account for businesses or organizations that assists in the collection of followers, communication, and transmission of information pertaining to service activities, sales, and marketing. Furthermore, it efficiently supports the management of sales and services, such as greeting messages, auto-response messages, coupons and reward cards, one-on-one chat, press releases, or identification LINE Official Account is categorized into three types: unverified account, verified accounts, and premium accounts, each with its own set of service fees. Each time a message is sent from a LINE Official Account sender, it is equal to a message sent to all LINE Official Account followers. The application can also send private messages to chat with a specific follower account without revealing the conversation to the other account's followers. In addition, the Line official account can automatically respond to questions because messages for the response are predefined. For text, content, images, video, audio, and messages can all be sent directly via the LINE Official Account as well.

C. LINE BOT

The LINE BOT is an official LINE account that implements the LINE Messaging API. The Line Official Account will configure the service system in message response without the requirement for a controller and can be used at any time [7].

D. Smart Notification in LINE application and service quality

The improvement or temporary shutdown of system services or any activity that may occur without the user's request is of great importance to the user. Message boards and email, on the other hand, need information receivers to constantly check to see if it is important or directly relevant. Users may miss important notifications due to their daily activities. Although there is an e-mail notification or a message from the system, which is direct communication with the user, it does not have sufficient capacity to capture users' attention. Therefore, users tend to miss important notifications as they only skim through those notifications [8], and users may disregard notifications regarding updates or information, which has become a major issue in terms of improving service quality.[9]

Additionally, not every notification from LINE is relevant to an individual user. However, after users register and provide information, they are more personalized for the user, which is also a solution to user notification ignorance. This enables users to receive real-time notifications that are more relevant to their specific needs. The service providers sending notification messages to users is described as a "Smart Notification," which displays only the important notifications directly on the smartphone or mobile device,

allowing the user to receive updated notifications at all times [10]

According to Thailand's digital usage statistics for 2021, LINE is the third most popular communication app, accounting for 86.2 % of the population using social media in the country [11], indicating that most people prefer to use LINE notifications, which are real-time smart notifications with the ability to interact with users directly. An organization can clearly communicate with its users in order to comprehend and obtain answers to any questions or misunderstandings, via the most commonly used communication channel that is unique to each user's communication. The fact that a large number of people are able to access it provides the user with the impression that the service has satisfied, or in some circumstances, exceeded expectations. It can be stated that the satisfaction of the users who get the service is an assessment of the service quality of the users, which is another method to enhance the service quality.

E. Smart Notification

The smart notification system sends information to users who have agreed to receive notifications. The system will function with computer programs or mobile electronic device apps, the majority of which are available on mobile electronic devices that are connected to the Internet. The user will get information either instantly or at the prescribed time by the service providers, which will be shown as a brief message notifying the user of the communication channel, who is sending information, and what information is being sent. Users can open the notification by tapping it, or if they ignore it, they can reopen it. Moreover, users can choose to turn on or off notifications. Smart notifications are designed to communicate with users of the notification system on various electronic devices in real time. Due to the structure of the system, notifications act as a display of information in addition to informing users of important information. Smart Notification is a fast way to provide information to users. [12].

III. PROPOSED ARCHITECTURE

The proposed methodological architecture is BCNPYLIB CHAT BOT (Fig.1), which has a LINE Official Account as a platform to communicate with users and developed a chatbot with Dialogflow that can correctly comprehend the meaning of the sentences that users type, allowing the chatbot to communicate directly with the user.
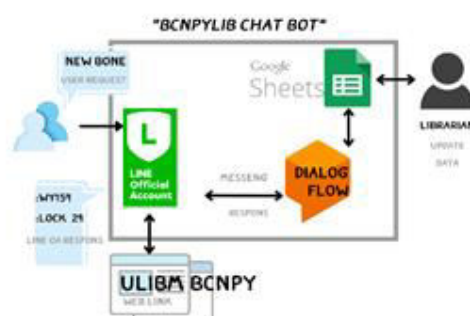

Fig. 1. Work flow BCNPYLIB CHAT BOT.

A. About BCNPYLIB CHAT BOT

BCNPYLIB CHAT BOT is a Chatbot that uses the LINE Messaging API service to link the user with the LINE official account, then uses a database (Google Sheet) to respond to the user's questions, with Dialogflow acting as a tool to analyze the answer. The user can enquire about the information at the library 24 hours a day. Furthermore, the library will collect users' requests and use them to improve the development of responses..

B. Dialogflow

Dialog flow is a Google platform for developing chatbots that analyzes user requests to identify intents and entities in their chats [13] and responds to users based on rules or flows. Dialog flow improves the flexibility of phrases received via the Google Sheets' webhook without the requirement to meet criteria. Most importantly, training phrases must be defined to ensure that there are words or sentences in the received text that match the intent.

C. Google Sheets

It is an online spreadsheet [14] that operates as a database and can update the answers so that they can be easily handled by the library's administrator to update the information.

D. System Union Library Management BCNPL LIB (ULIBM BCNPY)

It is an implementation of the LIFF feature: the LINE Front-End Framework, a platform for Web Views that works within LINE Official Accounts and opens HTTPS compatible Web Views within LINE applications [15]. The outstanding feature is the ability to show the Web View in full-screen mode, which can be customized in LIFF. The Web View has three display sizes: compact (50%), tall (75%), and full (100%). LIFF is also chatbot-compatible via a feature called Bot Link, which a developer expects will make it much easier to enable the search feature of the System Union Library Management BCNPL LIB (ULIBM BCNPY) running on the web browser.

E. LINE Official Account

It is a platform for interacting with users. It connects the LINE user to the server via the LINE Platform by using the LINE Messaging API functionality. The server should be linked to the LINE platform. Furthermore, when a user adds a LINE account as a friend or sends a message, the LINE Platform makes an instantaneous request to the server associated with the LINE account. This technology is known as Webhook, and it gives users the impression that they are communicating with other people.

IV. BCNPYLIB CHAT BOT'S FUNCTION

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and

import your prepared text file. You are now ready to style your paper; use the scroll down window on the left of the MS Word Formatting toolbar.

A. Includes: The CHAT BOT

Feature is an AI-powered chat with a BCNPYLIB CHAT BOT user (Fig.2). Administrators can update the information used to answer users' questions using Google Sheets, which serves as the system's database

Fig. 2. BCNPYLIB CHAT BOT interacting with the user.

B. Line rich menu function

Rich menu is a section at the bottom of a chat screen that can be customized to enable each section of the menu to change the features and correspond to the service at any time (Fig.3). The following are descriptions of each section of the rich menu.

Fig. 3. Rich menu at the bottom of a chat screen.

- During the coronavirus pandemic, *book rent*: is an online link to Google forms for making requests to borrow books without interaction with librarians.

- *eBooks by ChulaBook's*: An eBook is a web link to a web page for the usage of ChulaBook's ULIBM BCNPY eBooks.

- *Online information*: Online information on Google Sheets is a web link to the library's cloud-based Google Sheets, which includes online resources in the

form of Web Blocks, eBooks, documents, clip videos, and other information that offer free licenses on healthcare science services.

- *Search*: Search is a feature of the ULIBM BCNPY OPAC [16] book search web link that allows users to search for (hardcopy) books in libraries

- *Chat with librarian*: Talk to the librarian Chatbot is a text chatbot that is used to introduce the chatbot to BCNPYLIB CHAT BOT users

- *Office Hours*: Office hours is a chatbot message that notifies users of library hours.

C. *Information*

It is an notification function for users to comprehensively get information with the LINE Broadcast messages feature, a function to send information from the LINE official account to friends or account followers [17]. The data delivered can be in the form of text messages, photos, videos, voice messages, coupons, questionnaires, or rich messages, and the recipient group and timing of the sending can be specified

Fig. 4.   Notification feature of BCNPYLIB CHAT BOT

V.   EVALUVATION

The researcher based on the evaluation results to reference the satisfaction assessment of the learning support (library) of 422 nursing students in years 1-4 and 50 nursing teachers at Boromarajonnani College of Nursing in Phayao Province, Thailand.

TABLE I.   COMPARISON OF THE SATISFACTION ASSESSMENT OF LEARNING SUPPORT (LIBRARY) (N=427)

List	Semester 2/2563	Semester 3/2563
1.Notification of service-related activities and information resources.	4.03	4.40
2.Consistency in presenting information about new services, activities, and new information resources in a library.	4.21	4.30
3.User-friendly platform	3.83	4.20
4.BCNPYLIB CHAT BOT's accuracy and completeness of its responses	3.69	4.15
5.Communication channels' ease of use	3.60	4.53
Total	3.87	4.32

The assessment results of the learning support of "consistent notification of information related to the service, new activities, and information resources of the library" in the 2020 academic year found that the user's satisfaction before using the BCNPYLIB CHAT BOT was at 3.87 percent, compared to the user's satisfaction after using BCNPY CHAT BOT, with a slight increase in satisfaction assessment of 0.45%, accounting for 4.32% of the total users.

VI.   CONCLUSION

The researcher found that notifications and communication between users and the library are insufficient to keep users interested, which lowers users' satisfaction. Likewise, the library of Boromarajonnani College of Nursing had encountered communication problems, at which point the researcher developed the BCNPYLIB CHAT BOT system using the Line Official Account, Dialogflow, and Google Sheets. The main function of the system is the BCNPY CHAT BOT, which is linked to the System Union Library Management BCNPL LIB (ULIBM BCNPY) to cover the library's available services. In the BCNPYLIB CHAT BOT study, questions were expected to answer users' questions and to what extent they may enhance user satisfaction. Furthermore, a comparison of user satisfaction assessment results before and after the use of the BCNPYLIB CHAT BOT system revealed that satisfaction improved by 0.45 percent.

The BCNPYLIB CHAT BOT system is excellent in the comprehensive accessibility of library services, which is a web-based system in which the BCNPYLIB CHAT BOT system works as a contact point for services that must be accessed via a website with numerous URLs. It also enables users to do book searches and enquire about library services at any time. Additionally, the satisfaction survey results demonstrate that users may access services instantly and comprehensively via the BCNPYLIB CHAT BOT system's online social platform. Nonetheless, the BCNPYLIB CHAT BOT system discovered that, apart from the Chatbot and connections to other libraries' services, there is a lack of connectivity between the library user database in the ULIBM BCNPY database and the user database in the LINE official account, which can be developed to provide other convenient services to users. The researcher will continue to develop a system, such as an online membership card, that allows users to verify their identity through their LINE account in order to decrease the use of paper and the problem of forgetting membership cards, as well as to prevent someone from taking a right. Besides, the researcher intends to develop a notification service for returning books, requesting academic information via the Chatbot function, overdue fines, checking borrowing rights, overdue books, etc., and make users more aware of their borrowing and returning books and book return schedule, with the goal of allowing users to access the library's services efficiently and rapidly. Moreover, as the research employed a manual method of updating responses to questions, utilizing the manual input could be a burden for the administrator if there were several questions to be input into the Google Sheet. This problem will be addressed in the future by developing a system that uses NLP algorithms to create an AI system that will be able to recognize all types of frequently asked questions and automatically input them into the system.

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