Chatbot Designed for Graduate Students's Guidance Service

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Abstract: The main purpose of this study aimed to develop the chatbot designed for the graduate students' guidance services, which were divided into two major phases: Phase 1: The development of chatbot designed for the graduate students' guidance service, and Phase 2: The effects of chatbot' s implementation for the graduate students' guidance service. The data were statistically analyzed using mean, standard deviation and content analysis. The development of chatbot designed for graduate students' guidance services conceptualized with the theory of design and the development of machine learning process together with the theory of flat "dialogflow"-called flat form technology taken from Google. In academic collaborations with graduate students studying at the master's and doctoral levels, as well as the measurement and evaluation-related experts considered the suitability of the chatbot-oriented question and answer structures. Specifically, the educational technology and information technology-related experts' tryout and evaluation were all implemented for its effectiveness of chatbots. The findings of the study revealed that all the aspects of the applications of chatbot, with its $\bar{x}$ of 4.66 were rated at a very effective level as compared to all the aspects, it showed that the experts' similar opinions toward the graduate students' guidance services were mostly found. On the other hands, the graduate students' satisfactions on their graduate students' chatbot services, with its $\bar{x}$ of 4.52 were all rated at a very high level as compared to each aspect, it showed that the experts' similar opinions toward the graduate students' guidance services were mostly found. The results of the study have shown that the chatbots designed to provide the graduate students' advices were only one essential element that helped promote its research processaccording to comparing the correlations of thesis progress and the frequency use of chatbots. Also, in terms of designing the structures of questions with its answers, all the aspects of graduates' instructional management should be extensively manifested for making them more effective.

Keywords: Chatbot, Machine Learning, AI, Line, Research Methodology

I. INTRODUCTION

In the globalization, "technology" has played a very important role in people's present and future dimensions on their ways of life; moreover, technological advancements emerged with people's balanced life existence are considered a device necessarily facilitated for their ways of life in all societies. In Thailand, other different technological developments are all endeavored for its modernization and globalization, focusing on the application of technological information and communications to effectively managing their life-earning.

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Most importantly, the development of national education with emphasis on the significance of educational technology, according to the core national infrastructural policies, was officially modified under the B.E. 2562 Reorganization of Ministry, Sub-Ministry, and Department Act (19th Edition) established by the Ministry of Higher Education, Science, Research and Innovation. [1] The major authorities of this ministry were to direct the organizational management ofhigher education, science, research and innovation served for global changes and social equality, as well as to promote educational policies on B.E. 2560 – 2579 National Educational Scheme in relations to its strategic development of human resources, and the establishment of learning society. [2]

According to the 12th National Economic and Social Development Plan, it also emphasized on learning reforms together with its educational development, digital technological system for education, as well as the Thais' life-long learning opportunities via the application of information technology. It was, however, obvious that the government's application of information technology and communications was mostly signified for educational developments based on the application of information technology and communications. [3]

However, in order to provide learners' and enquirers' learning channels served for their reduction of educational gaps, as well as to facilitate the learners' ultimate accessibilities of instructional media, internet networks leading to learners' better learning achievements, in terms of educational dimensions, were all implemented for educational beneficiaries in cope with the presentation of instructional management. Thus, the technology-oriented instructional management was resulted in the university students' learning improvements, along with the university students' participation in their exclusive learning with lecturers, the creation of instructional media served for lecturers' interaction with their colleagues, university students' interaction with their lecturers, as well as their peer interaction. Not only were the university students' self-study reviewed, but also their selection of free course contents taught in convenient tentative schedules and sites, and their follow-up on academic learning achievements were supported for their idea-sharing. The governmental higher educational institutions' application of educational innovations via computer-assisted Instruction (CAI), e-book, online instructional management, and web-based instruction directly affected the lecturers' better solutions for technology-oriented instructional management so that the different characteristics of on-lined lessons was altered by the increasing numbers of developed educational innovations.

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That was to say, both the lecturers' virtual learning environment-based presentation and interactive learning-based long-distance instruction widely used as the global higher educational institutions' core instructional innovations were mostly designed for learners' real-life learning management.

Due to the number of graduate students spending more overtimes on their study plan set by curriculum requirements, the graduate students' inabilities of their thesis defense have nowadays caused different individual and social impacts, the program's inability of recruiting students' admission as scheduled. For examples, the study program cannot be accepted because the fewer numbers of graduated graduate students who have not graduated for different kinds of study programs; moreover, the lack of thesis advisors handling with their teaching workloads with graduate students is mostly found. Not only are some graduate students' thesis quality ignored when the limitation of one semester-spent thesis submission is requested for their continuation of study, but also the graduate students' ineffective organizational management is induced by the substandard quality of theses. Therefore, these problems cited above directly lead to the graduate students' no understandings of research methodology.

In the digital era, "technology" has played an important role in people's ways of daily life, and effective communication via websites and social media together with technological advancements in which either machine learning or artificial intelligence (AI) in integration with chat bots was benefited for human beings' effective communication, as well as business and social negotiation. In fact, chat bots were all implemented for different purposes. For examples, the news agencies' data notification via chats with other different news agencies' data notification via bots, shopping on-line services with stores via using chatbots, and customers' chatbot application-onlined information services. However, communications via texturing and voice chatting via call center services used with chat bots were all implemented for internal organizational communications [4].

For the interlocutors' primary spoken and written communications, the messaging application has been originally used for their daily lives whereas chat bots used for different applications were quickly accessed. Therefore, the application of chat bots was not only facilitated for updated instructional management, but also it was widely used for different governmental organizations, as well as business hospitality management. At the present, it is expected that the utilization of artificial intelligence (AI) has increased 48 percent of educational activities until the positive impacts of artificial intelligence (AI) are mostly found from the preschool students' to university students' different educational levels. [5] In order to gear in learners' maximum of AI-based education, however, chat bots were all created for different learning devices, and some of them were adapted for personalized tools.

A Chatbot (or Chatterbot), refers to a software or a machine that can interact with users socially; moreover, it is a virtual assistant that helps reply on not only users' questions, but also correct responses.

In the last few years, the application of chatbots substantially increased in various fields, such as health cares, marketing, educational issues, supporting systems, cultural Heritage, entertainment, and other different fields of study. In fact, major companies' development of chatbots has been found for industrial solutions and research; otherwise, some of the most famous technological companies with its popular systems include Apple Siri, Microsoft Cortana, Facebook M, and IBM Watson [6].

Furthermore, the application of chatbots has been provided for different ways of services via various websites so that these automated services together with its low costs are all resulted from the interaction of humans and computers. However, the long-term length of time and efforts are not only required to prepare conversation dialogues, but also the master bot-chatting makers' well-preparation must be mostly supported for accumulating the vast number of expected questions and answers [7]. Most importantly, the development of effective chatbots is considered one of the most challenging research tasks; conversely, the emulation of human dialogues, in fact, is a very difficult task and involves with drawbacks the research field of the natural language processing (NLP) [8]. Chatbots an automated computer program which reply to user as it understands input. Therefore, the development of chatbot designed for graduate students' guidance services leading to the lecturers', university students', as well as thesis-conducted graduate students' convenient research methodology for present and future studies will be facilitated for all different educational levels.

II. REVIEW OF THE LITERATURE

A. Artificial intelligence

Artificial intelligence (AI) is functioned as an intelligent computer system or an intelligent agent that is associated with human behaviors related to the abilities to memorize knowledge, to engage in humans' similar ways of life and environmental circumstances, as well as to comprehend humans' natural language systems [9]. In terms of marketing and service aspects, artificial intelligence, one of the key technological devices, can be implemented in the 21st century, meanwhile in terms of its training and development, both AI-supported digital assistants and chatbots can be proposed for different tasks. Also, the major purposes of artificial intelligence-oriented tasks are to book, register, and send reminders, to help answer questions, to solve organizational difficulties, to be functioned as personal assistants, points of contact, or virtual supporters and tutors, to provide easy-to-access individual services daily and worldwide, to encourage learners' learning motivation, as well as to organize different learning programs [10]. "Artificial intelligence" (AI) refers to the science that requires the creation of computers fully covered with its intelligence as machine learning is a simulation of human intelligence. Like human beings, the ability of learning taken from the artificial intelligence (AI) encompass four major elements: 1) Receiving the data; 2) Learning and interpreting data; 3) Knowledge Base – it is the part that memorizes the knowledge learned in the past events in order to help interpreting or using in decision-making and problem-solving, and 4) Planning & decision-makingwhen having fully understood the meaning of the data, the AI is needed to think about how it will respond.

B. Machine Learning

The concept of machine learning refers to the autonomous learning-oriented computer system that implements with available information; otherwise, the outcomes of machine learning will also depend on the accurate amount of imported data.In this study, supervised machine learning is guided for learning obtained from the heart of machine learning, which enables computers to learn autonomously, to analyze data by itself, as well as to process the data accurately. It is the fact that machine learning is the second important element of artificial intelligence (AI); accordingly, the functions of machine learning are to interpret the received data when the AI-based data are all perceived and cannot be interpreted using machine learning. Machine learning is defined as an application of artificial intelligence (AI) that provides the abilities of autonomous learning and improvement obtained from real-life experiences without being explicitly programmed. Also, it mainly focuses on the development of computer programs together with data accessibilities, as well as its learning implementation [11]. In terms of its primary characteristics, the ability to learn from past experiences is resulted in the utilization of previous inputs and the improvement of new outputs; otherwise, machine learning techniques can directly affect the analysis of the huge amount of data. [12]

C. Chatbot

Chatbots, in general, are functioned as computer programs that enable to interact with people using language-based interfaces. Specifically, the major purpose of chatbots aims at simulating intelligent humans' sociable interaction so that the speaker should have similar experiences in conversing with another person [13]. The types of interaction between humans and chatbots include searching for information, processing andadapting it to the users' needs, replying emails and voice orders, taking restaurant reservations, as well as simplifying conversation dialogues. In case of the popularity of chatbots, two major reasons encompass the extensive use of instant messaging programs and the apps-based model [14]. Chatbots' great potentialities can be all complemented for educators' and education-related administrators' practical use in terms of educational purposes. For example, the tutors' clearer explanation can be clarified for any puzzled questions taken from students' no class attendances. [15]

Chatbots are also applied as modular stimulus-response systems compared with its linguistic inputs and internal sample databases, and appropriate responding outputs. Databases related to knowledge are nowadays signified as the heart of the chatbot in which its recognition patterns, keywords and answers are stored; in other words, conversation flows are controlled by actual programs and coordinated by both inputs and outputs. Also, the activation of the knowledge database and possibly other models such as the output of spoken language [16].

Chatbot, which is a computer program that simulates human dialogues through messages or voices using artificial intelligence (AI)-based technology to interact with interlocutor. In the other word, this program is embedded on the Chat Application. Currently, chatbots are classified into two major patterns: 1) "Rule-based bot" or "Script bot" that functions and offers outcomes set by rules and keywords; 2) "AI-based bot" or "Intelligent bot" that has been developed with using the natural language processing (NLP). As a result, learning spoken and written expressions was engaged with the AI-based machine learning in which the flexibility of outcomes is more displayed that that of the rule-based bot.

Most importantly, the heart of a Chatbot is that Chatbot creators must have a large amount of data or big data that will enable its machine learning to perceive different types of conversations. In addition, chatbots are all needed to design cleared questions without confusing the users; otherwise, working with the chatbots more efficiently is also made. Thus, all of them are suitable to be developed for suggesting different ideas because they cannot only be stored for databases related to the recognition of keywords and answers, but also the flexibility of chatbots can be implemented from external databases. That is to say, the success of chatbots depends on the quality and the vast amount of knowledge. According to the analysis of chatbots' current capabilities, it has also showed that building knowledge databases must be taken times so that the effectiveness of chatbots is resulted from the developers' selection of different issues. In order to be served for the usage of Thai language designed for creating conversation dialogues, however, chatbots taken from dialog flows are all created because they can be used in conjunction with the Line Application, which is mostly preferred for students' use.

III. RESEARCH OBJECTIVE

The objectives of this research were:
- To develop the chatbot designed for the graduate students' guidance services
- To evaluate the effectiveness of chatbot designed for the graduate students' guidance services
- To evaluate the graduate students' satisfactions on the application of chatbot designed for the graduate students' guidance services
- To investigate the correlations of frequencies of accessing chatbots and thesis progress.

IV. SCOPE OF STUDY

A. Population and Sample

The researcher conducted an experiment with26 graduate students of Technological Education Program, Education Technology and Information Science Department, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok were all selected by the purposive sampling technique. These included eight master's degree students enrolling in the courses "Research Methodology in Vocational and Technical Education" and "Applied Research in Technical Education Technology", five graduate students of the doctoral degree enrolling in the course "Applied Research in Technical Education Technology", and thirteen graduate students conducting their thesis.

B. Variables Used for the Study

The research variables comprised:
▪ Independent variables were a chatbot designed for graduate students

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▪ Dependent variables:

(1) Effectiveness of chatbotdesigned for graduate students

(2) Graduate students' satisfactions

(3) Correlations of graduate students' thesis progress and the frequencies of accessing chatbots designed for graduate students' advices.

V. RESEARCH METHODOLOGY

The research methodology was divided into two major phases as follows.

Phase 1: The development of chatbot designed for graduate students' guidance services conceptualized with the theory of design and the development of machine learning process together with the theory of flat "dialogflow"-called flat form technology taken from Google, the scope of contents related to research methodology was designed for the structures of questions and answers served for graduate students' chatbot on their guidance services.

For research instrumentation, the procedures for constructing an assessment checklist on the educational experts' opinions toward the structures of questions and answers designed for graduate students' chatbot on their guidance services were all detailed as follows.

▪ Related documents related to the creation of assessment checklist designed for graduate students' guidance services, in consistence with its implementation, were all reviewed;

▪ Questions and answers of the chatbot taken from true information were designed for graduate students' guidance services and conversion of chatbot questions and answers into the structure of dialogflow, as shown in figure 1;
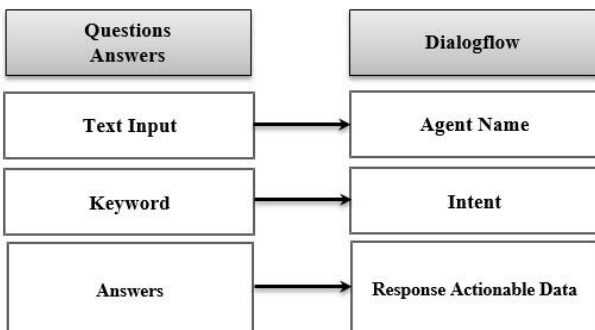

Figure 1: Conversion of chatbot questions and answers into the structure of dialogflow

▪ An assessment checklist on the experts' opinions toward the structures of chatbot's questions and answers was created for graduate students' guidance services in order to confirm its content validity ratio (CVR), which included its appropriateness of 1 and inappropriateness of -1 [17]. In this regard, nine major evaluation-oriented experts approved this research together with its appropriateness of structures of chatbot' s questions and answers designed for graduate students' guidance services; moreover, the appropriateness of all the approved questions with its CVR > 0.78 related to the chatbot' s questions and answers designed for graduate students' guidance services was mostly found;

▪ The experts' suggestions were adopted for the questions' and answers' structures of chatbot designed for graduate students' guidance services;

▪ The chatbot designed for graduate students' guidance services, according to the structures of questions and answers, was all developed based on "dialogflow" supported for its natural language understanding. Any different devices or inputs (queries) of users that were altered into "intents" were accessed through using its natural language processing; moreover, other entity recognitions could be performed with its original program.

Currently, more than 20 languages and the Thai language, in terms of the better output of "dialogflow", were certified with its natural language processing. Also, it was connected with different channels such as Facebook, Massager, Twitter Line, and different websites.

The development of chat bots divided into two major parts was detailed as follows.

Part 1: In the 1st part on the creation of dialogflow agent, it functioned as a communication device or an agent connected with queries and inputs that were all accesses by users' application of devices. Subsequently, its natural language understanding taken from agents directly affected the users' demands of intents. Next, response actionable data in connection with other different systems via API, in terms of its fulfillment, were all returned to users' application.

The components of dialogflow agent provided included:

Agents: Language options, machine learning, and other different concerns that can control users' behaviors are all set up.

Intents: End-users' intentions are categorized for each conversation turn.

Entities: Specific data taken from end-user expressions are both identified and extracted.

Integrations: Devices or services are directly handled for end-users' interaction.

Fulfillment: Connecting the service when using integrations.

Training phrases: Exemplifying phrases for what end-users might type or express.

Responses: Defining the text, speech, or visual responses returning to the end-user.

Default Fallback Intent: Matched when agent did not recognize an end-user expression.

In case of the users' no textures on their words or sentences, the misunderstandings of words and sentences were all resulted in training phrases so that provided statements were responded by its default fallback intent.

Part 2: Procedures for the connection of agent and LINE@Account were all detailed as follows.

▪ Creating the LINE Messaging API

▪ Providing the dialogflow's LINE Integration Setup

▪ Testing small talks with bots

Phase 2: Investigating the effects of chatbot designed for graduate students' guidance services

In evaluating the effectiveness of chatbot designed for graduate students' guidance services, procedures for creating an evaluation checklist of chatbot designed for graduate students' guidance services were all detailed as follows.

▪ Related documents related to the creation of the Item-Objective Congruence (IOC) based evaluation checklist with its questions on the effectiveness of chatbot' s performance selected by the Black Box Testing Technique were all reviewed.

▪ An evaluation checklist with the Item-Objective Congruence (IOC) approved by six major educational experts, which was used in figuring out its contentvalidity. In this process, the IOC was used in evaluating the items of the questionnaire based on the scores ranging from -1 to +1.

▪ A five-rating scale-based approved evaluation checklist with its questions related to the development of chat bots designed for graduate students' guidance services was rewritten.

▪ An evaluation checklist approved by five major educational technology and information technology-oriented experts was tried out and assessed by using Google form.

In evaluating the graduate students' satisfactions toward their chatbot services, procedures for creating an evaluation checklist on graduate students' satisfactions toward their chatbot services were all detailed as follows.

▪ Related documents with tis involved questions related to the creation of satisfaction evaluation were all reviewed.

▪ An evaluation checklist with the Item-Objective Congruence (IOC) approved by six major educational experts, which was used in figuring out its contentvalidity. In this process, the index of item-objective congruence (IOC) was used in evaluating the items of the questionnaire based on the scores ranging from -1 to +1. That was to say, (+1) meant congruent, meanwhile -1 meant incongruent. Also, (0) meant questionable. Statistically, the items with scores of lower than 0.5 were revised or eliminated; on the other hands, the items with scores of higher than or equal to 0.5 were all retained. In this research, the scores of 0.60 - 1.00 evaluated fromthe IOC were considered acceptable.

▪ A five-rating scale-based approved evaluation checklist with its questions related to the development of chatbot designed for graduate students' guidance services was tried out with 27 graduate students studying in the Department of Technical Education and Information, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, and this approved evaluation checklist selected by the Cronbach's α - Coefficient was testified for its validity analysis. In order to validate internal consistencies within the items conceptualized by Cronbach's alpha theory,[18] illustrated the values of coefficient Cronbach's alpha. In general, the score of more than 0.7 was considered acceptable; on the contrary, some authors suggested that the higher scores of 0.90 - 0.95 should be based on its reliability/validity [19]. From even the most reliable criteria of Cronbach's alpha theory, the study's questionnaire with a highly reliable score was rated at 0.907.

▪ The approved chatbot was testified with the sample group after an evaluation checklist on graduate students' satisfactions toward their chatbot services were all evaluated.

VI. RESULT AND DISCUSSION

The effects of developed chatbot with its structured questions and answers related to the development of chatbot designed for graduate students' guidance services encompassed 1) Instrumentation techniques; 2) Procedures for instrumentation, and 3) Research instrument' s validity, as shown in figure 2.
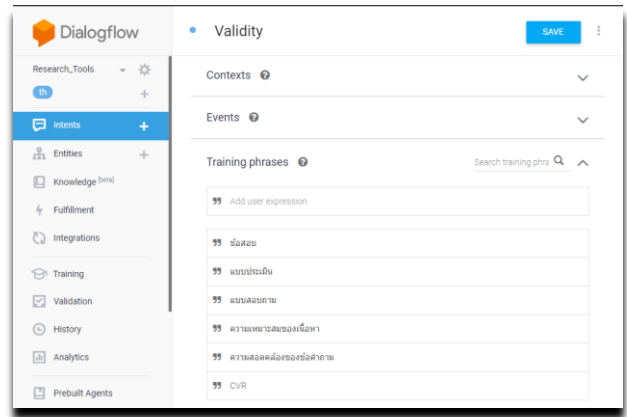

Figure 2: An example of structured questions and answers of chatbot designed for graduate students' guidance services on dialogflow

From the structured questions and answers of chatbot designed for graduate students' guidance services, the development of chatbot based on using the"dialogflow" in connection with the Line App, as shown in figure 3.
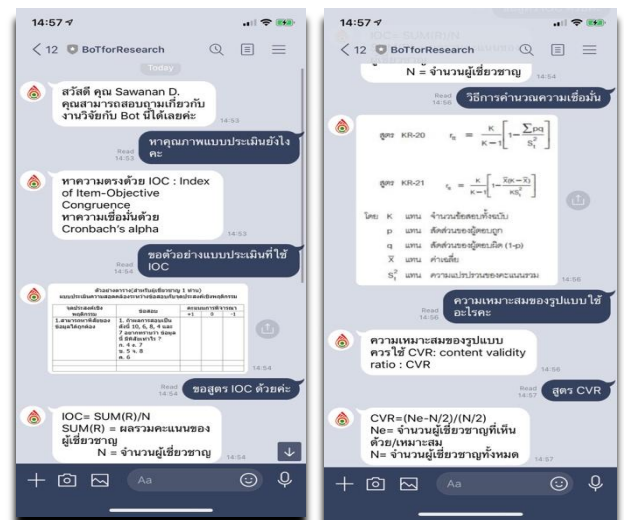

Figure 3: An example of chatbot's screen designed for graduate students' guidance services

The effects of evaluation of chatbot designed for graduate students' guidance services. The data were all analyzed using mean and standard deviation (S.D) in regards to the Likert-scale scoring criteria [20] as illustrated in Table I.

Table I: The effects of evaluation of chatbot designed for graduate students' guidance services

Evaluated Contents	Mean	S.D.	Level
1. Function Requirement Testing	4.12	0.63	Effective
2. Function Testing	4.93	0.27	Very Effective
3. Usability Testing	4.94	0.24	Very Effective
4. Performance Testing	4.42	0.62	Effective
5. Security Testing	4.87	0.35	Very Effective
Total	**4.66**	**0.58**	**Very Effective**

From table I, it showed that the effectiveness of chatbot designed for graduate students' guidance services was mostly effective as compared to each aspect, it was stated that both its function testing, usability testing and security testing were mostly effective, meanwhile its function requirement testing and performance testing were effectively found.

As compared to the data's discrimination, it showed that the discrimination of function requirement testing with its standard deviation (S.D.) of 0.63 were higher than that of other aspects, which were all consistent with all the lowest aspects, meanwhile its performance testing with its standard deviation (S.D.) of 0.62 was effectively found. Also, the experts' opinions toward other aspects of chatbot application were rated at a high level.

The effects of evaluating graduate students' satisfactions on their application of chatbot on guidance services. The data were all analyzed using mean and standard deviation (S.D) in regards to the Likert-scale scoring criteria as illustrated in Table II.

Table II. Levels of graduate students' satisfactions on their application of chatbot on guidance services

Evaluated Contents	x̄	S.D.	Level of Satisfaction
1. Chatbot were easy to use.	4.58	0.50	Very Satisfied
2. The interaction of questions and answers was quick.	4.42	0.50	Very Satisfied
3. The questions' accuracy, according to the users' requirements, was mostly found.	4.58	0.50	Very Satisfied
4. The scope of conversations was fully completed.	4.58	0.50	Very Satisfied
5. The beginning and ending lengths of conversations were appropriate.	4.62	0.50	Very Satisfied
6. Incorrect questions were all covered with Thai grammars and slangs.	4.42	0.50	Satisfied
7. Answers were all varied.	4.62	0.50	Very Satisfied
8. Mistakes on chat bot services were rarely found.	4.35	0.49	Satisfied
9. The quick application of chat bots was activated without advisors' suggestions.	4.50	0.51	Very Satisfied
10. The naturalness of conversations was mostly found.	4.62	0.50	Very Satisfied
11. The appropriateness of language usage was mostly found.	4.46	0.51	Satisfied
12. The application of chat bots was attracted.	4.38	0.50	Satisfied
13. The appropriateness of clicks on answer was facilitated.	4.54	0.51	Very Satisfied
14. This chat bot app could be learned anywhere and anytime.	4.57	0.50	Very Satisfied
15. Users' self-study was enhanced.	4.65	0.49	Very Satisfied
Total	**4.52**	**0.50**	**Very Satisfied**

Table II showed that the graduate students' satisfactions toward the application of chatbot designed for guidance services were very mostly found as compared to each aspect, it showed that the application of chatbot designed for graduate students' guidance services, with its standard deviation (S.D.) of 0.50, was differently found. Also, all the aspects of their graduate students' different opinions remained indifferent.

The interview of graduate students' on the use of chatbot, the content analysis was found as follow:
The graduate students' satisfactions on their chatbot on guidance services that the application can use for communication, easy to use, suit to learn anywhere and anytime.
These are the result from interviewing:
"Chatbot, easy to use and *convenient*"
"Easy to use. It helps me lots for thesis"
"Feel good with easy using chatbot. This app *helps me* understand research process"

Results of the study related to correlations of thesis progress and the frequencies in accessing chatbotss illustrated in Table III.

		Thesis Progress	Chatbot Access Frequencies
Thesis Progress	**Pearson Correlation**	1	.986[**]
	Sig. (2-tailed)		.000
	N	26	26
Chatbot Access Frequencies	**Pearson Correlation**	.986[**]	1
	Sig. (2-tailed)	.000	
	N	26	26

**. Correlation is significant at the 0.01 level (2-tailed).

From TableIII, it showed that the coefficients found in the correlations of thesis progress and the frequencies of accessing chatbots, with its significant difference of 0.01, were relatively involved with each other. Consequently, the students' frequencies of accessing chatbots directly affected their better improvements for thesis progress.

VII. CONCLUSION

In the application of chatbot with its structured questions and answers designed for the graduate students' guidance services, the scope of research instruments conducted with those graduate students included (1) Techniques for instrument design; (2) Procedures for research instrumentation, and (3) The validity of research instruments. In this regard, the developed chatbot conceptualized with the development of software and approved by educational experts were adopted for its well-systemized application appropriate for the graduate students' instructional management though using easy-to-access chat bots. This was because the users' academic knowledge obtained from the Line application was very effectively found. With references to the previous study related to the development of software [21], it revealed that in order to upgrade developed software and effective functions with its reliability and accuracy, testifying the effectiveness of software based on using the "Black Box Testing Technique" was mostly signified in terms of business requirements cited in the agreement of software system. However, the function of chatbots was a part of study on the model of m-learning designed for interactive inquiry so that the graduate students' satisfactions toward their application of chatbot were very effectively found. In other words, the graduate students' concentration on their study and interests on well-prepared online activities were all acquired because of their mutual interaction with chatbots, as well as their easy-to-access information taken from quick answers. In accordance with the previous study [22], it was also insisted that not only outdoor classroom activities, but also their participation in learning management, their real-time feedbacks taken from real situations, as well as the lecturers' realization of their graduate students' real-time assignment submission were all resulted from the implementation of m-learning.

REFERENCES

1. Ministry of Higher Education, Science, Research and Innovation. (2019).Reorganization of Ministry, Sub-Ministry, and Department Act (19th Edition) B.E. 2562. Available:https://www.mhesi.go.th/home/images/2562/T_0001.PDF
2. Office of the Education Council, Ministry of Education.(2017). "The National Scheme of Education B.E. 2560-2579".Available:http://backoffice.onec.go.th/uploads/Book/1540-file.pdf
3. Office of the National Economic and Social Development Board. (2017). The 12th National Economic and Social Development Plan (2017-2021). Available: https://www.nesdc.go.th/ewt_dl_link.php?nid=9640
4. Ahmed Ewais and Duaa Abu Samra. (2020). Adaptive MOOCs Based on Intended Learning Outcomes Using Naïve Bayesian Technique. *International Journal of Emerging Technologies in Learning*. Volume 15, No. 4, 4-21. Available: https://online-journals.org/index.php/i-jet/article/view/11420/6531
5. Tuomi, I. (2018). "The impact of artificial intelligence on learning, teaching and education: Policies for the future". Publications Office of the European Union, Luxembourg. Available:https://publications.jrc.ec.europa.eu/repository/handle/JRC113226
6. Francesco Colace, Massimo De Santo, Marco Lombardi, Francesco Pascale, Antonio Pietrosanto and Saverio Lemma. (2018). Chatbot for E-Learning: A Case of Study.*International Journal of Mechanical Engineering and Robotics Research*Volume 7, No. 5, 528-533. Available: http://www.ijmerr.com/uploadfile/2018/0831/20180831043721869.pdf
7. ChuthamaneeTangkathach. (2010). "Generating Conversation Dialogues for Chatbots Using Website Contents". (Thesis for a master's degree in Computer Science) Chulalongkorn University. http://doi.org/10.14457/CU.the.2010.1986
8. M. Yan, P. Castro, P. Cheng and V. Ishakian. (2016). Building a chatbot with serverless Computing. *The 1st International Workshop on Mashups of Things and APIs Article* No. 5. Available: https://www.researchgate.net/publication/311755516_Building_a_Chatbot_with_Serverless_Computing
9. Dali Luo. (2018).Guide Teaching System Based on Artificial Intelligence. *International Journal of Emerging Technologies in Learning*. Volume 13, No. 8, 90-102. Available: https://online-journals.org/index.php/i-jet/article/view/9058/5132
10. CäcilieKowald and Beate Bruns. (2019).New Learning Scenarios with Chatbots Conversational Learning with Jix: from Digital Tutors to Serious Interactive Fiction Game. *International Journal of Advanced Corporate Learning*. 12, No. 2, 54-62. Available: https://doi.org/10.3991/ijac.v12i2.11176
11. A. Sharma, and A. Sharma.)2018).Machine Learning: A Review of Techniques of Machine Learning. *JASC: Journal of Applied Science and Computations,*Volume 5, no. 7, pp 538-541. Available: https://doi.org/10.31979/etd.fhhr-49pm
12. PawitarDulari, Ajay Bhushan and Brijender Bhushan. (2019). Artificial Intelligence Approach for Identification of Diseases through Gene Mapping. *International Journal of Advanced Research in Biological Sciences.*Volume 6, Issue 12, 140-142. Available: https://www.researchgate.net/publication/338294032_Artificial_Intelligence_Approach_for_Identification_of_Diseases_through_Gene_Mapping
13. KulothunkanPalasundram, NurfadhlinaMohdSharef, Nurul AmelinaNasharuddin, Khairul AzharKasmiranandAzreen Azman. (2019). Sequence to Sequence Model Performance for Education Chatbot. *International Journal of Emerging Technologies in Learning*. Volume 14, No. 24, 56-68. Available: https://doi.org/10.3991/ijet.v14i24.12187
14. Jeton Arifi, Markus Ebner and Martin Ebner. (2019). "Potentials of Chatbots for Spell Check among Youngsters". International Journal of Learning Analytics and Artificial Intelligence for Education. Volume 1, No. 1, 77-88. Available: https://doi.org/10.3991/ijai.v1i1.10999
15. Allison, D.A. (2011)."Chatbots in the Library: is it time?" . Faculty Publications, UNL Libraries. Available: https://digitalcommons.unl.edu/libraryscience/280
16. Carayannopoulos, S. (2018).Using chatbots to aid transition. *International Journal of Information and Learning Technology*, Volume 35 (2), 118-129. Available: https://doi.org/10.1108/IJILT-10-2017-0097
17. Lawshe, C. H. (1975). "A quantitative approach to content validity". *Personnel Psychology,* 28(4), 563–575. Available: https://doi.org/10.1111/j.1744-6570.1975.tb01393.x
18. George, D. and Mallery, P. (2010). "SPSS for Windows Step by Step: A Simple Guide and Reference 17.0 Update". 10th Edition, Pearson, Boston.
19. Tavakol, M. &Dennick, R. (2011). Making sense of Cronbach's alpha. *International journal of Medical Education*, Volume 2, pp.53-55. Available: https://doi.org/10.5116/ijme.4dfb.8dfd
20. Likert, R. (1932). "A Technique for the measurement of attitudes". Archives of Psychology, Volume 22, No. 140, 1-55. New York University.
21. PongnarinLerdrungporn, KrisamantWattananarong and TeerapongWiripong. (2017). "Development of Learning Management System for Tablet. Graduate School ofKing Mongkut's University of Technology North Bangkok.Bangkok, Thailand. Available: http://202.44.34.85/index.php/jote/article/view/3299
22. Abdul Samad Dahri, Ahmad Al-Athwari and Azham Hussain. (2019).Usability Evaluation of Mobile Health Application from AI Perspective in Rural Areas of Pakistan. *International Journal of Interactive Mobile Technologies*.Volume 13, No. 11, 213-225. Available:https://www.online-journals.org/index.php/i-jim/article/view/11513/6031

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