Research Article

MAKING A LINE CHATBOT FOR RELIGIOUS TALK AND CONNECT: A CASE STUDY OF TONCHUEAK TEMPLE IN THAILAND'S DIGITAL TIME

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Abstract

Background and Objectives: Tonchueak Temple, situated in Nonthaburi Province, Thailand, has actively embraced digital transformation. Despite utilizing various digital platforms, the temple faced a critical challenge: Effectively engaging its digitally-native lay followers. These conventional methods lacked the real-time, personalized, and interactive capabilities essential for fostering continuous connection and efficient information dissemination, thus creating a significant gap in devotee engagement. To bridge this crucial gap, this study aimed to design and develop a LINE chatbot to enhance communication and engagement between Buddhist devotees and the Tonchueak Temple in Nonthaburi Province, Thailand, while assessing user satisfaction with the implemented system. This innovative tool was specifically envisioned to not only strengthen the temple's communication but also to foster deeper engagement among Buddhist lay followers, intrinsically supporting the temple's faith-based community-building efforts and promoting more effective and meaningful interaction. Additionally, the research sought to assess user satisfaction with the implemented chatbot system.

Methodology: This study adopted a mixed-methods research design. The qualitative phase involved in-depth interviews with five purposively selected key informants, comprising two temple personnel from Tonchueak Temple, one software developer, and two lay users with prior experience using the LINE chatbot. The quantitative phase employed a structured satisfaction questionnaire administered to a sample of 215 individuals, selected through convenience sampling, who had previously interacted with the chatbot. Descriptive statistical techniques, including frequency distribution, mean, and standard deviation, were used to analyze the quantitative data and assess overall user satisfaction with the system.

Main Results: The output of this study was the development of the Tonchueak Temple LINE chatbot, featuring a user interface that included a rich menu comprising six primary visual options. Users could interact with the system either by selecting commands via the rich menu or by entering text in a conversational format within the LINE application. The chatbot was designed to

process user inputs and provide responses in a variety of formats. Based on the evaluation results from a sample group, the overall user satisfaction with the developed chatbot was rated at a high level, with a mean score of 4.32 and a standard deviation of 0.71. The highest-rated item indicated that users strongly agreed the chatbot effectively reflected Tonchueak Temple's adaptation to the digital era.

Involvement to Buddhadhamma: This article explored Applied Buddhism and its role in Buddhism and globalization, specifically in the aspect of Buddhism and digital technology. This highlighted how digital platforms could enhance religious communication and engagement in a globalized world. The LINE chatbot developed for Tonchueak temple in this study played a significant role as a supportive tool for facilitating access to religious activities and fostering participation in the spiritual life of Buddhist devotees. It primarily functioned to disseminate information about the temple's major religious events and also provided links to the temple's official communication channels on other platforms, thereby enabling continuous and convenient access for the public. This structural support aligned with Buddhist principles by promoting the right understanding (Sammā-diṭṭhi) and encouraging the practical application of Dhamma in daily life. Moreover, the ethical and contextually appropriate use of technology exemplified skillful means (Upāya-kosalla) in integrating religion into the digital age.

Conclusions: This study developed a LINE chatbot to enhance communication and engagement between Buddhist devotees and Tonchueak Temple, using LINE Messaging API and Dialogflow. User trials revealed a high level of satisfaction, especially with the system's ease of use, friendliness, and the temple's proactive adaptation to digital transformation. Crucially, beyond merely facilitating information exchange, this chatbot proved to be a viable tool for fostering spiritual growth by providing accessible religious knowledge and supporting the formation of a cohesive digital Buddhist community. While acknowledging existing limitations in natural language comprehension and human-like interaction, which highlight the need for advanced natural language processing capabilities, the implemented chatbot represents a promising prototype for religious institutions aiming to deepen faith-based connections and cultivate digital groups in the evolving digital landscape.

Keywords: LINE Chatbot Development, Buddhist Laypeople, Dialogflow, Thai Religious Institution, Digital Religious Engagement

Introduction

In the context of digital communication, where information and communication technologies have become deeply embedded in people's daily lives, the use of communication applications-particularly LINE-has emerged as a vital channel across all age groups. As of 2024, Thailand recorded approximately 56 million monthly active users (MAUs) on the LINE application, accounting for 78.2% of the total population and 85.7% of all internet users nationwide. These statistics underscored the widespread adoption and popularity of LINE as one of the most extensively used communication platforms in the country. The application has been integrated across diverse domains, including personal communication, business operations, and access to various digital services. Such pervasive use highlighted the central role of LINE in Thailand's digital

infrastructure and its growing significance in shaping contemporary modes of social interaction and service delivery. In this evolving landscape, these platforms have fundamentally transformed how individuals connect and engage, extending their influence into religious practices and community participation. Consequently, traditional communication methods often proved insufficient in reaching younger, digitally-native audiences and maintaining their sustained engagement in an increasingly digitalized society.

The LINE chatbot represented a pivotal element within the broader digital ecosystem of the LINE application. It was engineered to function as an automated communication interface, leveraging natural language processing (NLP) and machine learning algorithms to enable dynamic, interactive engagement with users. Operating as virtual assistants, these chatbots facilitated two-way communication, wherein user-generated queries or commands were processed and were met with responses generated through pre-configured logical frameworks. LINE chatbots have demonstrated considerable efficacy in enhancing the communicative capabilities of the LINE platform, particularly with respect to information dissemination and fostering user engagement. Their application spanned multiple sectors. In the business domain, chatbots were shown to significantly improve customer experience and service satisfaction (Daza Vergaray et al., 2023). Within healthcare, they were utilized to support telemedicine, patient interaction, and administrative coordination (Laymouna et al., 2024). In education, chatbots play a constructive role in promoting personalized learning, providing academic guidance, and supporting performance assessment (Okonkwo & Ade-Ibijola, 2021). In the context of cultural tourism in Thailand, LINE chatbots were strategically adopted to strengthen communication and enhance visitor engagement. For example, Rothjanawan et al. (2024) developed a LINE-based chatbot tour guide to support cultural tourism in Narathiwat Province, offering users curated content on local heritage sites, traditions, and events. Similarly, Sookkhee & Chatree (2024) introduced "Nong Lamduan" a chatbot designed to recommend tourist destinations within Sisaket Province. Collectively, these cases underscored the technological potential of LINE chatbots to support tourism development grounded in cultural capital within the Thai context.

Tonchueak Temple is a historically significant and long-established Buddhist temple located in Bang Yai District, Nonthaburi Province, Thailand, in close proximity to the researcher's residence and workplace. At the time of this study, the temple was engaged in the revitalization of its cultural capital through the reconstruction of a new ordination hall, intended to replace the previous structure that collapsed approximately a decade ago. This reconstruction effort had been financially supported by contributions from devout donors through multiple channels, with the objective of achieving timely and effective completion. In alignment with contemporary trends, the temple had integrated digital technologies and modern media as strategic tools to enhance its communication capabilities, disseminate information about religious activities, and facilitate the collection of donations from Buddhist followers. Social media platforms, including Facebook and TikTok, had been actively employed to extend the temple's informational reach to audiences beyond the immediate local community. While these platforms had moderately increased public

participation and engagement, they still faced limitations in providing the personalized, immediate, and comprehensive interaction necessary to deeply connect with a digitally-native and often younger demographic, a gap where traditional temple communication methods were largely ineffective.

In response to the increasing digital transformation and the need to strengthen communication and engagement between Buddhist devotees and Tonchueak Temple, the researcher recognized the importance of developing a LINE chatbot as an alternative channel for facilitating the exchange of information between the temple and its lay community. This initiative was not only intended to enhance the convenience of communication and expand the temple's social capital but also to address an academic gap, as the application of chatbot technologies in religious contexts remained relatively underexplored. Although Wongnasri & Promjuk (2024) proposed innovative strategies for disseminating Buddhist teachings through modern information technologies-emphasizing the formation of online Buddhist communities through discussion groups, workshops, retreats, and seminars aimed at fostering engagement among practitioners in Surat Thani Province-such approaches remained largely confined to the use of general social media platforms and did not yet reflect a concrete integration of chatbot technologies for religious communication. Therefore, the development of a LINE chatbot to support religious communication and engagement represented a promising and scalable approach. The researcher anticipated that the outcomes of this chatbot development would enable Tonchueak Temple to accumulate greater social capital within digital spaces, aligning with the principle of Sammā-diṭṭhi (Right View or Right Understanding) by fostering accurate and accessible information and demonstrating Upāya-kosalla (Skillful Means or Skill in Means) in utilizing modern technology for spiritual benefit. This was expected to contribute to the cultivation of long-term relationships with devoted followers and might subsequently enhance the temple's economic capital, thereby providing a sustainable foundation for the preservation and advancement of its cultural capital over time.

Objectives

This study aimed to design and develop a chatbot to enhance communication and engagement between Buddhist devotees and Tonchueak Temple, located in Nonthaburi Province, Thailand. Additionally, it sought to evaluate user satisfaction with the implemented chatbot system.

Methodology

The research was conducted using the following methodology.

Research Design

This study employed a Research and Development (R&D) approach, integrating both qualitative and quantitative methodologies within a Mixed Methods Research paradigm. This mixed-methods design was chosen for its suitability in addressing the multifaceted nature of developing and evaluating a digital communication tool in a religious context. The qualitative phase provided in-depth insights into current communication gaps and user needs, which were crucial for the foundational design and iterative development of the chatbot. Subsequently, the quantitative phase allowed for the systematic and empirical evaluation of user satisfaction with the developed system,

ensuring a comprehensive assessment that qualitative methods alone could not provide. Initially, the qualitative phase focused on collecting, analyzing, and synthesizing data concerning existing communication patterns and frequently asked questions between Buddhist practitioners and temple officiants. Insights derived from this phase directly informed the design and development parameters of the LINE chatbot. Following this, the study transitioned to a quantitative phase aimed at evaluating user satisfaction with the fully developed chatbot among a selected sample population.

Sample and Informants

For the qualitative research, key informants were selected using purposive sampling. This intentional selection was based on their specific roles and experiences crucial for understanding the temple's communication ecosystem and chatbot development: Two personnel from Tonchueak Temple provided insights into temple operations and devotee needs; One software developer offered expertise on technical feasibility and development challenges; And two general users with prior LINE chatbot experience contributed perspectives on user interaction and expectations. This deliberate choice of informants ensured comprehensive and diverse perspectives vital for the initial needs analysis and design phase.

For the quantitative research, the sample comprised 215 general Buddhist practitioners who had previously interacted with the LINE chatbot. The sample size was determined using Cochran's formula (Cochran, 1953), with a 5% margin of error and a 95% confidence level, as the exact population proportion was unknown. Convenience sampling was employed for participant selection due to the specific nature of the study, where participants were drawn from the existing pool of users who had already engaged with the newly developed LINE chatbot at Tonchueak Temple. While it was acknowledged that the potential limitations regarding generalizability, this approach was practical and appropriate for assessing satisfaction among the target user group within the study's scope.

Research Tools

The research instruments employed in this study comprised the following:

1. Structured Interviews (Qualitative Phase): A comprehensive literature review of books, academic texts, and online databases was conducted to identify key issues related to digital communication in religious contexts. These insights were then synthesized to define the scope and content of the interview questions, ensuring alignment with research objectives. The draft interview guide was subsequently submitted to three experts for content validity assessment, with revisions made based on their feedback prior to implementation.

2. LINE Chatbot Development: The LINE chatbot was developed iteratively based on key findings from qualitative research, serving as foundational data for its design. The development process commenced with a thorough needs analysis. This was followed by the design phase, technical development, rigorous testing, and refinement cycles. LINE Messaging API and Google Dialogflow were specifically chosen due to their robust Natural Language Processing (NLP) capabilities, ease of integration, and proven track record in handling a large volume of user interactions in the Thai language context, thereby supporting complex conversational flows necessary for religious communication.

Feedback from three experts was incorporated at various stages to inform subsequent revisions, which ensured both functional completeness and accuracy. The revised chatbot then underwent a final expert review for validation.

3. Satisfaction Questionnaire (Quantitative Phase): A structured satisfaction questionnaire, consisting of closed-ended items using a 5-point Likert rating scale, was developed. Its content validity was assessed by a panel of three experts utilizing the Index of Item-Objective Congruence (IOC). Items with IOC scores below 0.50 were revised, achieving final scores ranging between 0.61 and 1.00. For reliability assessment, the finalized questionnaire was pilot-tested with 30 participants whose characteristics closely resembled the actual study sample. The resulting data were analyzed using statistical software to determine internal consistency, yielding a Cronbach's Alpha coefficient of 0.89, indicating high reliability. The revised instrument was then re-evaluated by the same panel of experts for final appropriateness and confirmed for administration to the actual study sample.

Data Collection

For qualitative data collection, the researcher employed several techniques with five key informants, including direct observation of the temple environment, field note-taking, audio recording, in-depth interviews, and focus group discussions. Upon completion of fieldwork, interview recordings were transcribed and integrated with observational and written notes for data synthesis. The data were then verified for accuracy, completeness, and credibility prior to being subjected to analytical procedures. For quantitative data collection, the researcher first obtained formal permission to survey 215 participants. Subsequently, the finalized LINE chatbot was introduced to the sample group for practical trial use. Alongside the trial, a satisfaction questionnaire was administered to assess user perceptions. The researcher provided further clarification on the research project as needed and encouraged participants to raise any questions. Participants were given sufficient time to complete the evaluation independently, and preliminary checks were conducted to ensure completeness of responses before data analysis. All data collection adhered to strict ethical protocols. Participants provided informed consent (Explicitly or Implied by Completion) after being fully briefed on the study's purpose, their rights (Voluntary Participation, Withdrawal, Confidentiality), and data privacy. Cultural sensitivity guided all interactions, aligning with Buddhist principles.

Data Analysis

Qualitative data analysis was conducted using thematic content analysis, a descriptive-analytical approach. All raw data collected from interviews and observations were systematically categorized and coded based on their relational attributes and emerging patterns. The content was then analyzed in alignment with relevant theories and conceptual frameworks and organized into logical thematic categories. Subsequently, the findings were presented in a descriptive narrative format. These qualitative insights served as a foundational basis for designing the LINE chatbot within the context of Tonchueak Temple. For quantitative data analysis, upon completion of data collection, the researcher verified the completeness of responses in the assessment forms. The data were then input into and analyzed using a statistical software package. The results were presented using descriptive statistical measures, including frequency, mean, and standard deviation. These simple

statistics provided a clear overview of the user satisfaction levels, identifying general trends and key areas of approval or areas needing improvement within the chatbot system, thus facilitating straightforward conclusions regarding its effectiveness. The results were displayed in tabular format accompanied by explanatory narratives to ensure clarity of interpretation.

Results and Discussion

The research findings were presented in two main parts, aligning with the study's objectives. Firstly, qualitative insights gathered from key informants were instrumental in shaping the design and development of the LINE chatbot, ensuring its functionality addressed specific communication gaps and user needs. Subsequently, the quantitative results provided a comprehensive evaluation of user satisfaction with the implemented chatbot system. This integrated presentation allowed for a clear understanding of both the development process informed by qualitative data and the empirical assessment derived from quantitative findings, as follows.

1. The design and development of a LINE chatbot aimed to serve as a tool for strengthening communication and enhancing the engagement of Buddhist laypeople with Tonchueak Temple in Nonthaburi Province. Additionally, the chatbot functioned as a medium for disseminating information and promoting the temple's activities. The user interface featured a rich menu comprising six main options: Luang Pho Vihara, About Tonchueak Temple, Tonchueak Temple Museum, LINE Stickers, Tonchueak Temple Map, and Contact Tonchueak Temple, as illustrated in Figure 1(B). The development process was conducted in the following sequential steps:

Step 1: Requirements Analysis: This phase involved analyzing data obtained from the qualitative research to gain a comprehensive understanding of the context of the temple and the communication needs of both Tonchueak Temple and its Buddhist lay community.

Step 2: Chatbot Design: An interactive design approach was employed, comprising two key components: Conversation flow design and user interface design. The conversation flow design involved planning how the chatbot would respond to user inquiries, particularly when users input varied and complex questions or commands. Keyword identification played a crucial role in enabling the chatbot to accurately interpret user intentions. The conversational structure was designed using flowcharts to map out the dialogue pathways and interaction patterns between the chatbot and the users. This structure ensured that the chatbot could respond to user inquiries in a systematic and content-aligned manner. Additionally, it facilitated the effective handling of various scenarios, such as providing basic information about the temple or promoting upcoming events. The user interface design incorporated a rich menu as the primary interactive component, enabling users to conveniently select topics of interest through visually structured options. This menu was designed to be visually appealing, user-friendly, and capable of facilitating quick access to essential information. The chatbot's response formats were tailored to the nature of the content, encompassing text messages, infographics, multimedia, or relevant links. Furthermore, the chatbot's language style was carefully designed to be clear, comprehensible, and respectful,

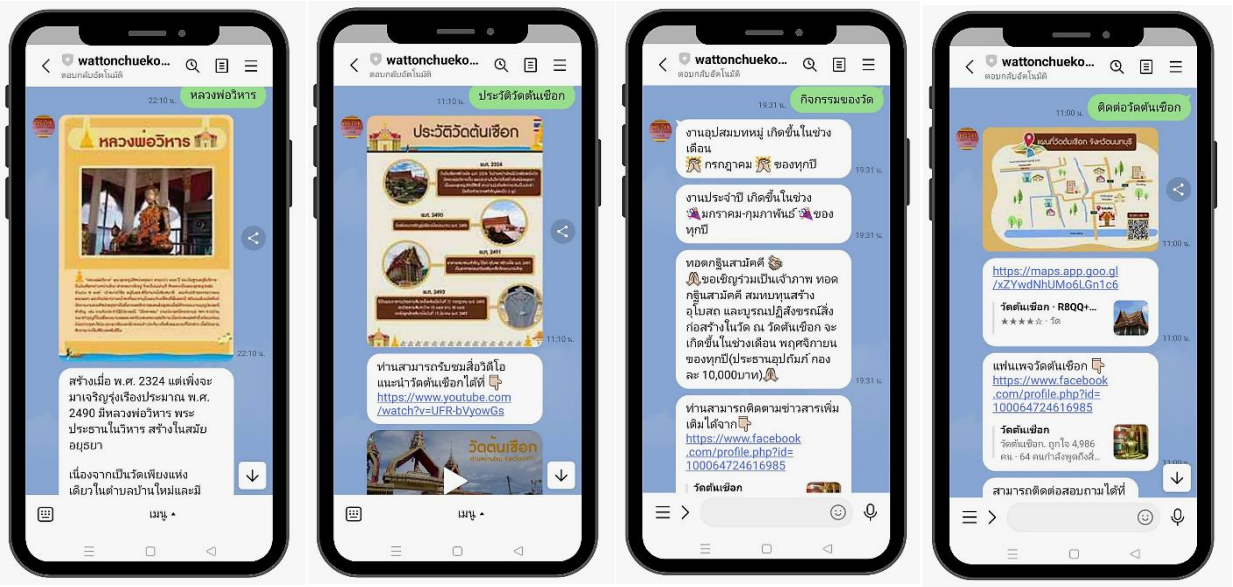
taking into account the religious context-striking a balance between approachability and reverence. This approach aimed to ensure a smooth and engaging user experience.

Step 3: Chatbot Development: This phase employed the LINE Messaging API in conjunction with Dialogflow, a natural language processing (NLP) platform that enabled the chatbot to comprehend user queries and generate contextually appropriate responses. 1) Intents: These represented predefined configurations that identified user intentions or desired queries, such as greetings, information about the temple, temple activities, or contact details. 2) Keywords: These were specific words or phrases entered by users to express greetings or request information, such as "Hello," "History," "Activities," or "Contact." An example of how user keywords associated with greeting intents were configured was illustrated in Figure 1(A). 3) Responses: These were the reply messages that the chatbot delivered when user input matched a predefined keyword within an intent, as shown in Figure 1(B). For instance, when a user typed "Hello," the chatbot utilized a Dialogflow Agent to process the input, converted it into a corresponding intent, and routed it to the appropriate response module that had been predefined for that intent. Each intent could accommodate multiple variations of questions and responses, thereby enhancing the diversity and naturalness of the chatbot's conversational capabilities. However, if a user posed a question that did not match any predefined intents, the chatbot would default to a fallback response (A Generic or Default Reply Indicating it Could not Understand the Query). Therefore, careful and deliberate keyword definition was essential to ensure that the chatbot could accurately detect and effectively process user queries.

(A) Intent and Keywords (B) Response

Figure 1 Examples of Keywords for the Greeting Intent and Chatbot's Response for the Intent

Step 4: Testing and Optimization: The process was conducted collaboratively by the development team in consultation with three domain experts: A software development specialist, a content expert, and a communication expert. The testing process focused on three key aspects: 1) Conversation Flow Testing: This involved assessing whether the chatbot could accurately guide users through predefined topics, such as temple information, upcoming activities, and contact details. It also evaluated the chatbot's ability to correctly detect keywords and deliver appropriate responses as configured; 2) System Stability Testing: This included assessing the responsiveness of the system and its ability to effectively transmit and receive data between the LINE Messaging API and Dialogflow; and 3) Content and Language Testing: This focused on evaluating the clarity and appropriateness of the chatbot's responses, including the use of polite language, informational accuracy, and consistency with religious context. The feedback provided by the experts was taken into consideration and used to refine the content to ensure clarity, accuracy, and contextual appropriateness within the setting of Tonchueak Temple. Keyword detection mechanisms were also optimized to enable the chatbot to interpret a broader range of user input variations. Additionally, the user interface-including the rich menu-was refined to enhance aesthetic appeal and improve usability. Following these enhancements, the chatbot was rendered more complete and better aligned with user needs and expectations. An illustration of the chatbot's responses to various user queries is presented in Figure 2.



(A) Luang Pho Wihan: the Famous Buddha Image of the Temple.

(B) History of Tonchueak Temple.

(C) Activities of Tonchueak Temple.

(D) Contact Tonchueak Temple

Figure 2 Examples of Responses from the Designed Chatbot

In light of the aforementioned chatbot design and development process, it could be discussed that Dialogflow was predominantly employed as the core natural language processing (NLP) engine for interpreting user queries in chatbot design and development. However, the design of the user interface varied depending on the platform employed. For instance, certain studies developed chatbots as applications or web-based systems, such as the tourism/temple chatbot developed by Sreenivasulu et al. (2024). Their chatbot utilized Google Dialogflow to provide information on historical sites in India, including temple histories, event schedules, and user inquiries, through a conversational interface. The system focuses on enhancing the user experience through natural and user-friendly interactions, accompanied by visual and textual content (Sreenivasulu et al., 2024). In contrast, the Tonchueak Temple chatbot employed a Rich Menu, allowing users to immediately select topics of interest, unlike Sreenivasulu et al. (2024) system, which required users to manually type questions. Another example from a Catholic context was the chatbot developed by Sutono (2019), which aggregated Mass schedules from church databases and delivered them through natural language conversations with users in Indonesia (Sutono, 2019). This system shared key characteristics with the Tonchueak Temple chatbot, as both utilized Dialogflow and NLP for processing religiously contextualized natural language interactions. However, the Catholic chatbot was implemented as an Android application that required users to first download the app to their smartphones before typing messages or selecting menus. In contrast, the Tonchueak Temple chatbot operated via the LINE social media platform, a widely used application in Thailand, which users could access simply by adding the chatbot as a friend. The inclusion of a Rich Menu further facilitated user interaction by reducing the need to manually input commands. Furthermore, studies such as that of Chen & Tsai (2021) explored the use of the LINE Messaging API in conjunction with the Rich Menu in alternative contexts, providing a useful point of comparison. They developed a LINE-based chatbot for managing public buildings, similar to the Tonchueak Temple chatbot, enabling users to access various menu options without manually inputting commands. However, Chen & Tsai's (2021) system emphasized the management of technical building data, necessitating more complex testing procedures. In contrast, the Tonchueak Temple chatbot centered on religious content within a community context, emphasizing accessibility for the general Buddhist public. In summary, a commonality across the Tonchueak Temple chatbot and the aforementioned studies was the adoption of Dialogflow for natural language processing and flexible user interaction, both of which contributed to delivering user-friendly information dissemination. Nevertheless, differences existed in access channels and interface design; The Tonchueak Temple chatbot prioritized the LINE Messaging API and Rich Menu within the LINE application to align with its widespread usage in Thailand. In contrast, other studies developed chatbots directly for web or smartphone applications without employing the LINE platform or the Rich Menu feature. Nonetheless, both approaches possessed distinct advantages tailored to their respective target audiences and usage contexts.

2. The results of the satisfaction assessment regarding the Tonchueak Temple LINE chatbot were as follows.

Table 1 The sample satisfaction assessment result

Assessment Items	$\bar{x}$	S.D.	Level
Content and Design Aspects			
1. The content presented by the chatbot was accurate and reliable.	4.20	0.77	Satisfied
2. The chatbot was easy to use, required minimal learning, and was user-friendly.	4.55	0.64	Very Satisfied
3. The chatbot delivered information through a variety of formats, including text, images, multimedia, and hyperlinks.	4.43	0.73	Satisfied
4. The information provided by the chatbot was clearly presented and easy to understand.	4.25	0.76	Satisfied
5. The language used by the chatbot was polite, appropriate, and aligned with the cultural and religious context of the temple.	4.30	0.75	Satisfied
6. The chatbot understood various phrasings of questions, conveying the same user intent.	3.95	0.62	Satisfied
7. The color tones of the menu and accompanying visuals were aesthetically harmonious and pleasing.	4.40	0.75	Satisfied
Overall Content and Design Aspects	**4.30**	**0.72**	**Satisfied**
Usefulness and Applicability Aspects			
1. It facilitated convenient access to information about Tonchueak Temple.	4.26	0.75	Satisfied
2. It enhanced the ease of communication with Tonchueak Temple.	4.44	0.73	Satisfied
3. It felt like conversing with a human.	4.07	0.72	Satisfied
4. It reflected Tonchueak Temple's adaptation to the digital era.	4.58	0.54	Very Satisfied
5. It fostered a sense of connection and emotional engagement with Tonchueak Temple.	4.31	0.73	Satisfied
6. It served as a practical and beneficial tool for users.	4.40	0.72	Satisfied
Overall Usefulness and Applicability Aspects	**4.34**	**0.70**	**Satisfied**
Overall Evaluation	**4.32**	**0.71**	**Satisfied**

Table 1 presents the satisfaction evaluation results of 215 participants regarding the developed LINE chatbot, categorized into two aspects: Content and design, usefulness and application. The assessment comprised 13 items in total, with an overall mean score of 4.32, indicating a high level of satisfaction. In the content and design dimension, participants expressed a high level of satisfaction ($\bar{x}$ = 4.30, S.D. = 0.72). The highest-rated item was "The Chatbot was Easy to Use, Required Minimal Learning, and was User-Friendly," with a mean score of 4.55. This reflected that the chatbot's conversational design was well-suited for general users, allowing access and usage without requiring advanced technological knowledge. Additionally, it facilitated a positive user experience and reduced barriers to accessing information about the temple. Conversely, the lowest-rated

item in this category was "The Chatbot Understood Various Phrasings of Questions Conveying the Same User Intent" ($\bar{x}$ = 3.95, S.D. = 0.62). This suggested that the chatbot still had limitations in natural language processing, particularly in interpreting diverse linguistic expressions that convey the same intent. Such limitations might affect user experience in scenarios requiring greater flexibility in system responses. Regarding the usefulness and application dimension, participants reported a high level of satisfaction ($\bar{x}$ = 4.34, S.D. = 0.70). The highest-rated item was "It Reflected Tonchueak Temple's Adaptation to the Digital Era," with a mean score of 4.58. This indicated that participants recognized and appreciated Tonchueak Temple's efforts to integrate contemporary technology in enhancing communication with Buddhist followers, representing an organizational adaptation aligned with current digital information access behaviors. The lowest-rated item in this dimension was "It Felt Like Conversing with a Human" ($\bar{x}$ = 4.07, S.D. = 0.72). This finding implied that, although the chatbot performed well in delivering basic information, it lacked the capability to engage in naturally flowing or emotionally nuanced interactions akin to human conversation. This remained a common limitation of chatbot technology, underscoring the need for further development in emotional intelligence and contextual responsiveness.

In discussing the evaluation results regarding user satisfaction with the Tonchueak Temple LINE chatbot, it was found that the highest level of satisfaction in terms of content and design stemmed from the chatbot being easy to use, requiring minimal learning, and demonstrating user-friendliness ($\bar{x}$ = 4.55, S.D. = 0.64). This reflected a design approach that prioritizes simplicity and user-friendliness. This factor aligned with several previous studies, which indicated that ease of use is a crucial element influencing user satisfaction with chatbots. For instance, Casadei et al. (2023) found that the complexity of tasks performed by a chatbot significantly affects user trust and satisfaction. Specifically, when a chatbot is capable of dividing conversations into clear and manageable steps, it helps reduce complexity and enhance user satisfaction. Additionally, Silva & Canedo (2023) proposed that a chatbot conversation design that is simple, clear, and flexible can significantly improve user satisfaction and engagement. In the context of chatbot deployment in the banking sector, Alshibly (2024) reported that chatbot usability directly influences customer satisfaction. Overall, it was concluded that the Tonchueak Temple chatbot, which targets general Buddhist users who may not possess advanced technological skills, was accessible and immediately usable. This was especially effective when deployed on the LINE application, a platform already familiar to Thai users, thus further facilitating ease of use and high satisfaction. Similarly, in the aspect of usefulness and application, the item receiving the highest satisfaction rating was that the chatbot demonstrated the temple's adaptation to the digital age ($\bar{x}$ = 4.58, S.D. = 0.54). This reflected the capability of religious institutions to adopt digital technology to enhance communication and religious services in alignment with the community context and digital dynamics. Such innovative use of technology exemplifies Upāya-kosalla (Skillful Means or Skill in Means), allowing the temple to effectively promote Sammā-diṭṭhi (Right View or Right Understanding) by making Buddhist activities more accessible in the digital era. This conclusion supports the policy recommendation by Ngamkom (2024), which advocates for the integration of technology to empower temples and communities,

thereby preserving peace and cooperation in the digital era. Furthermore, several other studies also reflected such technological adaptation. For example, the study by Müller and Friemel (2024) proposed a dynamic model for digital media use in religious communities, emphasizing that digital media can complement religion's role in creating meaning and fostering social relationships. Similarly, the research by Abiola et al. (2025), which examined the impact of AI-driven social media strategies on religious evangelism and Christian community engagement in Nigeria, found that the use of AI tools such as chatbots and sentiment analysis significantly enhances the participation of believers in digital communities.

Conversely, the aspect of content and design that received the lowest satisfaction from participants was the chatbot's ability to comprehend the diversity of user queries. This finding was consistent with the study by Portugal et al. (2024), which emphasized that intent classification was a critical component in developing chatbots capable of effectively responding to user needs. This was particularly pertinent in conversational recommender systems, where understanding user intent enabled chatbots to deliver more relevant and personalized recommendations. However, the same study by Portugal et al. (2024) also identified intent classification as an ongoing challenge. This challenge arose from the linguistic variability in user communication and the complexity of intents, which might involve multiple layers or ambiguous meanings within a single utterance. Such factors might hinder the chatbot's ability to accurately and comprehensively interpret user intentions. This might partly explain why participants using the Tonchueak Temple LINE chatbot perceived the interaction as dissimilar to human conversation. Consequently, they rated this aspect of the chatbot with the lowest satisfaction. This observation aligned with findings from Laymouna et al. (2024), who reported that chatbots could enhance the quality and efficiency of healthcare services. However, despite high user satisfaction, participants also noted persistent technological constraints, particularly limitations in natural language comprehension and the chatbot's ability to emulate truly human-like interaction. This aligned with broader research; For instance, Liu et al. (2024) examined user perceptions regarding chatbots' capacity to exhibit empathy, finding that even advanced chatbots powered by large language models (LLMs) like GPT-4, despite generating high-quality dialogue, were perceived as lacking human-like empathy. This deficiency negatively impacted the overall conversational experience and user satisfaction, further exacerbated by user expectations (A Potential Bias) for sophisticated interaction from AI tools. Moreover, in the nuanced context of religious communication, specific cultural factors, such as the importance of subtle emotional connection, reverence, and interpersonal warmth in spiritual guidance, might inherently influence user perceptions. The current technological limitations meant the chatbot could not fully replicate these culturally valued aspects, thereby influencing its perceived effectiveness in fostering deeper engagement beyond information dissemination.

Originality and Body of Knowledge

This section presents the unique contributions and the established body of knowledge stemming from the study's findings, as illustrated in Figure 3. This study identified key design and development considerations for religious chatbots, which constituted a novel framework for integrating digital technology into faith-based communication systems. This approach exemplified Upāya-kosalla (Skillful Means or Skill in Means) by employing modern tools to foster Sammā-diṭṭhi (Right View or Right Understanding) within the digital sphere. These considerations are articulated through five interrelated components in the figure, each contributing to the scholarly and practical advancement of chatbot applications in religious contexts:

Figure 3 Key Design and Development Considerations for Religious Chatbots

Component 1: Development Model: This study proposed a development model for religious chatbots based on a systems analysis approach, identifying five core components essential for effective implementation: 1) Contextual analysis of the specific temple environment; 2) Conversation design aligned with religious norms; 3) Strategic application of natural language processing (NLP)

technologies; 4) Iterative testing and refinement with input from interdisciplinary experts; and 5) Evaluation based on real user feedback. This model could be further extended into a systems-based conceptual framework for the development of chatbots in other religious institutions, emphasizing design approaches that were effectively aligned with specific institutional contexts and religious principles.

Component 2: Innovative Design: This study introduced an innovative design approach tailored to the religious context of Tonchueak Temple, utilizing the LINE Messaging API in conjunction with Dialogflow to develop an integrated system comprising structured dialogue flows, rich menu interfaces, and natural language processing modules. Unlike general-purpose chatbots, this design was intentionally aligned with Thai religious ethics and cultural context, marking a significant advancement in faith-based conversational technology.

Component 3: Role Expansion: The chatbot developed for Tonchueak Temple significantly expanded the temple's role in the digital space by serving as a proactive communication tool that facilitated "Immediate" and "Continuous" engagement with both local and remote followers. This illustrated how religious institutions in Thailand were adapting to the digital age, fostering new forms of social capital and participatory religious experience through technology.

Component 4: Community Building: This research served as a prototype for digital religious community building by presenting an empirical case of cultivating religious engagement through LINE, a widely used platform in Thai society. This approach provided a replicable model for other temples and religious organizations seeking to establish sustainable online Buddhist communities, effectively bridging traditional cultural practices with modern digital technologies.

Component 5: Technological Gaps: The study also highlighted critical technological limitations, particularly in the chatbot's ability to accurately interpret varied expressions of identical user intent and its lack of human-like responsiveness. These findings underscored the ongoing challenge of achieving "Human-Like Communication" in chatbot design, pointing to a need for further advancement in natural language understanding and empathetic interactions.

Conclusions and Recommendations

This study uniquely contributed to the digital transformation of religious institutions by pioneering the design and evaluation of a LINE chatbot within a temple context. It filled a critical gap in understanding how interactive AI tools could enhance faith-based communication and community building. This study identified key design and development considerations for religious chatbots, which constituted a novel framework for integrating digital technology into faith-based communication systems. This innovative application of technology embodied Upāya-kosalla (Skillful Means or Skill in Means) as a channel for engagement, thereby strengthening social capital within the Buddhist community and supporting the development of Sammā-diṭṭhi (Right View or Right Understanding) through accessible digital channels. This study yielded two key findings that aligned with its objectives. The first finding concerned the design and development of a chatbot as a tool to enhance communication and engagement between Buddhist laypeople and the Tonchueak Temple in Nonthaburi Province. The resulting system allowed users to input data

either by selecting commands from a rich menu or by typing conversational messages within the LINE application. The chatbot was capable of processing queries and responding with various formats, including text, images, multimedia, and relevant hyperlinks. This system was developed using the LINE Messaging API in combination with Dialogflow. The second finding was derived from the experimental deployment of the chatbot among a sample of 215 participants. The results showed that overall user satisfaction was high, with a mean score of 4.32. The highest-rated aspect was the chatbot's ease of use and user-friendliness. This reflected the success of a design approach intended to facilitate inclusive participation across user demographics. Furthermore, participants expressed high satisfaction with how the chatbot represented Tonchueak Temple's efforts to adapt to the digital age. This was particularly due to its deployment on LINE, a platform deeply embedded in everyday Thai communication. This development indicated that the chatbot thereby extended the temple's communication channels from the local community to external audiences. It also fostered both "Immediate" and "Continuous" engagement with younger Buddhist audiences who prefer digital modes of interaction. Conversely, the lowest-rated aspect was the chatbot's limited ability to understand semantically diverse questions that share a common intent. Users also reported a lack of perceived human likeness in the chatbot's conversational experience. These issues highlighted current limitations in the chatbot's natural language processing capabilities. This challenge highlighted the need to improve intent recognition and to develop communication models that more closely resemble natural human interaction. Based on these findings, it was recommended that chatbot development prioritize the careful and comprehensive specification of keywords, as this directly impacted the chatbot's processing and response capabilities. The successful implementation at Tonchueak Temple highlighted this LINE chatbot as a valuable model, demonstrating how religious organizations could effectively implement these findings to enhance digital engagement. This model held significant potential for scaling or adapting to other religious institutions and diverse cultural contexts, offering a blueprint for deepening faith-based connections in the digital era. Despite these positive outcomes, this study had limitations, including its specific geographical and religious context and the convenience sampling method for quantitative data. Future research should explore broader applications across different religious denominations and regions, investigate long-term user engagement and spiritual impact, and address advanced NLP capabilities to overcome current interaction limitations.

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References

Abiola, R. P., Idowu, A. A., Oyeniyi, S. O. & Afolaranmi, A. O. (2025). Impact of AI-Driven Social Media Strategieson Christian Evangelism and Digital Congregation EngagementinIkeja Lagos State. Journal of Nigerian Association Counsellors, 4, 211-221. https://doi.org/10.5281/zenodo.14623305.

Alshibly, H. H. (2024). Examining The Mediating Role of Customer Empowerment: The Impact of Chatbot Usability on Customer Satisfaction in Jordanian Commercial Banks. Cogent Business & Management, 11(1), 2387196. https://doi.org/10.1080/23311975.2024.2387196.

Casadei, A., Schlögl, S. & Bergmann, M. (2022). Chatbots for Robotic Process Automation: Investigating Perceived Trust and User Satisfaction. In Proceedings of 3rd International Conference on Human Machine Systems (ICHMS).(pp. 1-6). Florida, United States of America. IEEE . https://doi.org/10.1109/ICHMS56717.2022.9980826.

Chen, K. L. & Tsai, M. H. (2021). Conversation-Based Information Delivery Method for Facility Management. Sensors, 21(14), 4771. https://doi.org/10.3390/s21144771.

Cochran, W. G. (1953). Sampling Techniques. New York, United States of America: John Wiley & Sons.

Daza Vergaray, A., Peralta Robles, W. F. & Salazar Jiménez, J. A. (2023). The Impact of Chatbots on Customer Satisfaction: A Systematic Literature Review. TEM Journal, 12(3), 1407-1417.

Laymouna, M., Ma, Y., Lessard, D., Schuster, T., Engler, K. & Lebouché, B. (2024). Roles, Users, Benefits, and Limitations of Chatbots in Health Care: Rapid Review. 26, e56930. https://doi.org/10.2196/56930.

Liu, T., Giorgi, S., Aich, A., Lahnala, A., Curtis, B., Ungar, L. & Sedoc, J. (2024). The illusion of empathy: How AI chatbots shape conversation perception. Proceedings of The AAAI Conference on Artificial Intelligence, 39(13), 14327-14335.

Müller, J. & Friemel, T. N. (2024). Dynamics of digital media use in religious communities-A theoretical model. Religions, 15(7), 762. https://doi.org/10.3390/rel15070762.

Ngamkom, P. B. A., Nithibunyakorn, P. M. H., Janro, P. N., Chongla-iad, P. & Chantra, T. (2024). A Community Administration and Management for Creating Peacheful Community According to Buddhist Peacheful Means: Analytical Study of Wat Chedi, Chalong Sub-District, Sichon Disdrict, Nakhon Si Thammarat province. Journal of Buddhist Anthropology, 9(4), 345-358.

Okonkwo, C. W. & Ade-Ibijola, A. (2021). Chatbots Applications in Education: A Systematic Review. Computers and Education: Artificial Intelligence, 2100033. https://doi.org/10.1016/j.caeai.2021.100033.

Rothjanawan, K., Rattanachu, C. & Phetjirachotkul, W. (2024). Tour Guide Application for Tourist via Line Chatbot - In the case of Multicultural Tourism, Narathiwat Province. International Journal of Science and Innovative Technology, 7(1), 35-43.

Silva, G. R. S. & Canedo, E. D. (2022). Towards User-Centric Guidelines for Chatbot Conversational Design. International Journal of Human-Computer Interaction, 40(2), 98-120.

Sookkhee P. & Chatree, J. (2024). Developing the "Nong Lamduan" Line Chatbot Application to Recommend Tourist Attractions in Sisaket Province. Journal of Applied Information Technology, 10(1), 83-95.

Sreenivasulu, G., Kumar, P. P., Sandhya, M., Chandra, S. D. & Divya, P. B. S. (2024). Enhancing Visitor Experience Through a Chatbot for Historical Places in India Using Google Dialogflow. Journal of Engineering Sciences, 15(4), 1962-1966.

Sutono, E. P. (2019). Aplikasi Chatbot Menggunakan Dialogflow Api Untuk Informasi Jadwal Misa Di Gereja Katolik Berbasis Android. [Doctoral dissertation, Universitas Komputer Indonesia]. Thesis Central Library Universitas Komputer Indonesia. https://elibrary.unikom.ac.id/id/eprint/994.

Wongnasri, P. & Promjuk, W. (2024). Strategies for Driving Buddhism Propagation in the Changing Context of Innovation and Modern Information Technology for Reaching Diverse Target Groups Surat Thani Province. Journal of Social Science and Cultural, 8(11), 293-302.