

Empowering Malaysian Pharmacists in Research: Satisfaction, Use Continuation and Post-Use Confirmation of Using A Conversational Agent: A Multicenter Study

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Abstract: Artificial intelligence–based conversational tools are increasingly explored to support healthcare research activities. ResearchBOT is a free-to-use artificial intelligence support platform developed by pharmacists to assist users in clarifying clinical research– related questions. This multicenter cross-sectional study evaluated pharmacists' perceptions of usability, post-use confirmation, and intention to continue using ResearchBOT.

An online survey was conducted among public sector pharmacists in Negeri Sembilan and Pahang, Malaysia. Participants interacted with ResearchBOT following a guided scenario involving at least five different research- and statistics-related questions and completed a structured questionnaire comprising usability (Post-Study System Usability Questionnaire), post-use confirmation, and use continuance domains, measured on a 7-point Likert scale. Descriptive statistics, reliability testing, correlation analysis, and multiple linear regression were performed using IBM SPSS version 26.

A total of 223 responses were collected, with 217 included in scale analysis. The sample comprised pharmacists with a mean age of 32.1 ± 5.0 years, mean working experience of 7.53 ± 4.94 years, and mean research experience of 3.06 ± 3.77 years. Mean scores indicated positive perceptions of usability (5.35 ± 1.02), post-use confirmation (5.34 ± 1.11), and use continuance (5.38 ± 1.09). Internal consistency was excellent across all domains (Cronbach's $\alpha > 0.95$). Strong correlations were observed between usability and use continuance ($r = 0.759$), usability and post-use confirmation ($r = 0.736$), and post-use confirmation and use continuance ($r = 0.755$). Multiple linear regression showed that usability ($\beta = 0.472$, $p < 0.001$) and post-use confirmation ($\beta = 0.420$, $p < 0.001$) were significant independent predictors of intention to continue using ResearchBOT, explaining 67.2% of the variance ($R^2 = 0.672$). Demographic variables were not statistically significant predictors after adjustment.

ResearchBOT demonstrated favorable acceptance among pharmacists. Usability and confirmation of expectations play a critical role in sustained adoption of AI-supported research tools in clinical pharmacy practice.

Keywords: ResearchBOT, artificial intelligence, usability, pharmacists, clinical research, technology acceptance.

I. INTRODUCTION

Artificial intelligence (AI) has increasingly been applied in healthcare to support clinical decision-making, education, and research processes [1,2,3]. In the context of clinical research, healthcare professionals often face challenges in understanding research methodology, statistics, and interpretation of findings, particularly in settings with limited access to formal research support [4,5,6]. Healthcare professionals, being in the frontline of duty, often have valuable insights on improving healthcare

delivery systems but find themselves inadequately equipped with the necessary research knowledge to validate and publish their insights for the greater good [4,5,6]. Consequently, valuable and critical insights to improve healthcare service delivery may be lost.

Chatbots, defined as computer programs designed to mimic human conversation, have demonstrated potential as valuable tools for data collection, feedback provision, and intervention delivery in research contexts [7,8,9,10]. Globally, numerous studies have reported successful implementation of chatbots across various domains [1,2,3,11,12]. However, only a limited number have been utilized for educational purposes [13,14]. A study by Chin et al. (2023) examining COVID-19 pandemic-related topics discussed with a commercially available social chatbot found that such platforms provide insights into people's informational and emotional needs during global health crises, indicating the potential use of chatbots to provide accurate health information and emotional support [15]. Furthermore, Essel et al. reported that students who interacted with a chatbot performed better academically compared to those who interacted with the course instructor [16].

In the Malaysian context, research on chatbot acceptance and utility is emerging. Peng et al. identified multiple barriers and facilitators of Malaysian men who have sex with men's acceptance of an AI chatbot designed to assist in HIV testing and prevention [17]. Mokmin et al. evaluated a chatbot developed to educate users and provide health literacy, finding that 73.3% of respondents found the chatbot helpful in understanding health issues and providing good conversation [18].

ResearchBOT is a free-to-use AI-based conversational support platform developed collaboratively by four pharmacists from Hospital Tuanku Ampuan Najihah and one pharmacist from Hospital Raub, Malaysia. Built using the popular open-source conversational bot framework RASA [19,20,21], ResearchBOT was designed to assist users in clarifying clinical research-related questions, including study design concepts,

biostatistics analysis, sampling methods, research registration processes in the National Medical Research Register (NMRR), statistical interpretation, and research terminology. The platform cleverly detects user intent to provide instant, concise, and accurate information to research-related enquiries, with information extracted and validated by experts in the field. In the event of inability to provide an answer, ResearchBOT brings human expert support into the loop to ensure all users' doubts are addressed. ResearchBOT is trained to benefit beginners or intermediate-level researchers the most and functions as a supportive educational tool that does not replace formal research training, ethical oversight, or expert consultation.

While AI conversational tools have shown promise in healthcare education and information retrieval, user acceptance and continued use depend heavily on perceived usability and confirmation of expectations following initial interaction [22,23,24,25]. Understanding these factors is essential to ensure responsible and sustainable integration of AI tools in clinical research environments. As ResearchBOT is a newly developed conversational bot, evaluation of user perceptions is crucial for its continued development and adoption.

This multicenter study aimed to assess pharmacists' satisfaction, use continuance, and post-use confirmation after using ResearchBOT as compared to online search engines among pharmacists from public sectors in Negeri Sembilan and Pahang. Specifically, the study sought to (i) assess the levels of satisfaction, use continuance, and post-use confirmation after using ResearchBOT as compared to online search engines, and (ii) identify predictors of use continuance of ResearchBOT among pharmacists from public sectors in Negeri Sembilan and Pahang.

II. METHODS

A. Study Design and Setting

This multicenter cross-sectional study was conducted using an online survey among pharmacists working in public healthcare facilities in Negeri Sembilan and Pahang, Malaysia, in accordance with the approved study protocol. The study involved government healthcare facilities in two states, including hospitals, district health offices (*Pejabat Kesihatan Daerah*, PKD), and State Health Departments (*Jabatan Kesihatan Negeri*, JKN).

B. Study Population and Sampling

The target population comprised pharmacists from public sectors (all hospitals, healthcare clinics, and State Health Departments) in Negeri Sembilan and Pahang. At the time of the study, Negeri Sembilan had a total of 575 pharmacists, while Pahang had 833 pharmacists, yielding a combined total of 1,408 pharmacists.

A minimum sample size of 289 was calculated using the Krejcie and Morgan formula based on a response distribution of 50%, a confidence level of 95%, and a margin of 5% error, followed by an additional 20% dropout rate and a finite population correction [26,27]. A quota sampling method was applied to ensure an even distribution of responses from pharmacists from different working settings across the two states.

Inclusion criteria comprised pharmacists currently working in any public sector facilities within Negeri Sembilan and Pahang. Exclusion criteria included pharmacists currently on long leave away from work (e.g., maternity leave).

C. Study Procedure

Ethical approval was obtained from the Medical Research Ethics Committee (MREC) prior to commencement. Participants were first invited to attend a one-hour virtual Continuous Medical Education (CME) session in batches to receive briefings related to ResearchBOT given by two co-investigators (S.K.K.S. for Pahang pharmacists and N.P.R. for Negeri Sembilan pharmacists). Following the briefing, a link to the online survey form was distributed to participants. The purpose of the study was explained to participants prior to their participation, and consent was obtained through the online survey link.

Participants were provided with a standardized scenario requiring them to pose at least five different clinical research or statistical questions. They were instructed to first use a conventional online search engine and subsequently interact with ResearchBOT. Following the interaction with both tools, participants completed a self-administered questionnaire assessing their perceptions of ResearchBOT. Participants who completed the survey were rewarded with Continuing Professional Development (CPD) points.

D. Study Instrument

The questionnaire comprised four sections:

Part A: Demographic characteristics of participants

Part B: Usability and satisfaction assessed using 16 items adapted from the Post- Study System Usability Questionnaire (PSSUQ) [28]

Part C: Use continuance (3 items) [22,23,24,25]

Part D: Post-use confirmation (3 items) [22,25]

All perception items in Parts B, C, and D were rated on a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree), as specified in the protocol. The questionnaire was sent to senior pharmacists for face validation, reviewed and refined accordingly. Pilot testing was conducted, and Cronbach's alpha was used to assess internal consistency. The finalized questionnaire was made available in online format via Google Form for data collection.

E. Data Collection and Management

As the survey was in online format (Google Form), all responses received were automatically generated in Excel format for download and data analysis. No personal identification details were included in the online survey form. Participation was voluntary, and responses were managed with a high level of confidentiality and anonymity. All downloaded responses were kept on a password-protected database, accessible only on one of the investigators' password-protected computers. On completion of the study, data in the computer were copied to CDs and the original data erased. CDs and any hardcopy data were stored in a locked office of the investigators and maintained for a minimum of three years after completion of the study.

F. Data Analysis

Data were analyzed using descriptive statistics to summarize demographic characteristics and scale scores. Internal consistency reliability was assessed using Cronbach's alpha. Pearson correlation analysis examined relationships between constructs. Multiple linear regression analysis was conducted to identify predictors of use continuance, with usability and post-use confirmation entered as independent variables alongside demographic factors. Statistical significance was set at $p < 0.05$, in accordance with the protocol. All statistical analyses were performed using IBM SPSS Statistics software version 26 [29]. The study tested the null hypothesis that there are no significant predictors of use continuance of ResearchBOT among pharmacists.

III. RESULTS

A. Participant Characteristics

A total of 223 responses were received, with 217 complete responses included for scale analysis. The mean age of participants was 32.1 ± 5.0 years. The majority of respondents were female, and the sample included pharmacists from both Negeri Sembilan and Pahang. Mean working experience was 7.53 ± 4.94 years, while mean research experience was 3.06 ± 3.77 years.

B. Reliability and Descriptive Analysis

All scales demonstrated excellent internal consistency:

Usability (PSSUQ): Cronbach's $\alpha = 0.984$

Use continuance: Cronbach's $\alpha = 0.951$

Post-use confirmation: Cronbach's $\alpha = 0.969$

Mean scores indicated positive perceptions across all domains:

Usability: 5.35 ± 1.02

Use continuance: 5.38 ± 1.09

Post-use confirmation: 5.34 ± 1.11

C. Correlation Analysis

Usability was strongly correlated with use continuance ($r = 0.759$, $p < 0.001$) and post-use confirmation ($r = 0.736$, $p < 0.001$). Post-use confirmation was also strongly correlated with use continuance ($r = 0.755$, $p < 0.001$), indicating significant associations among all three constructs.

D. Regression Analysis

Multiple linear regression analysis demonstrated that usability ($\beta = 0.472$, $p < 0.001$) and post-use confirmation ($\beta = 0.420$, $p < 0.001$) were significant independent predictors of intention to continue using ResearchBOT. The model explained 67.2% of the variance in use continuance ($R^2 = 0.672$). Demographic variables, including age, working experience, and research experience, were not statistically significant predictors after adjustment. Based on these findings, the null hypothesis was rejected.

IV. DISCUSSION

This multicenter study demonstrated that ResearchBOT was positively received by pharmacists, with high levels of perceived usability, confirmation of expectations, and intention for continued use. The findings highlight that user-centered design and alignment between user expectations and actual system performance are critical determinants of sustained adoption of AI-supported research tools.

The excellent internal consistency across all measurement domains (Cronbach's $\alpha > 0.95$) indicates the reliability of the adapted instruments in the Malaysian pharmacist population. The strong positive correlations observed between usability, post-use confirmation, and use continuance align with established technology acceptance models, particularly the expectation-confirmation model proposed by Bhattacharjee (2001) [22]. These findings suggest that when users find a system easy to use and when the system meets or exceeds their expectations, they are more likely to continue using it.

The regression analysis revealed that usability and post-use confirmation jointly explained 67.2% of the variance in use continuance, with both factors serving as significant independent predictors. This finding emphasizes the importance of ensuring not only that AI tools are user-friendly but also that they consistently deliver on user expectations. For ResearchBOT, this translates to maintaining accurate, concise, and relevant responses to research-related queries while preserving an intuitive interface.

Interestingly, demographic variables such as age, working experience, and research experience did not significantly predict use continuance after adjustment. This suggests that ResearchBOT's acceptance transcends demographic boundaries, making it potentially useful for pharmacists across different career stages and experience levels. This aligns with the platform's design goal of benefiting both beginners and intermediate-level researchers.

ResearchBOT serves as a practical, pharmacist-developed platform to support clarification of clinical research questions, particularly in resource-constrained settings where access to research mentorship and formal training may be limited. The platform's ability to provide instant, validated responses and escalate to human expert support when needed addresses a critical gap in research capacity building among healthcare professionals. While the platform does not replace formal research training or expert guidance, it provides accessible support that may enhance research confidence and engagement among healthcare professionals.

The study's findings have important implications for the broader integration of AI tools in healthcare research. As healthcare systems increasingly explore digital solutions to support professional development and capacity building, understanding factors that drive sustained adoption becomes crucial. The success of ResearchBOT demonstrates that locally developed, context-specific AI tools can achieve high acceptance rates when designed with user needs and expectations in mind.

Limitations: This study has several limitations. The cross-sectional design limits causal inference regarding the relationships between variables. The study was conducted only among pharmacists in two Malaysian states, which may limit generalizability to other healthcare professionals or geographical settings. Additionally, the study assessed intention to continue use rather than actual long-term usage patterns. Self-reported measures may be subject to social desirability bias, although the anonymity of the online survey likely mitigated this concern.

V. CONCLUSION

This multicenter study demonstrated that ResearchBOT was positively received by pharmacists from public healthcare facilities in Negeri Sembilan and Pahang, with high levels of perceived usability, confirmation of expectations, and intention for continued use. Usability and post-use confirmation emerged as significant independent predictors of use continuance, jointly explaining 67.2% of the variance. These findings underscore the critical importance of user-centered design and alignment between user expectations and system performance in driving sustained adoption of AI-supported research tools in clinical pharmacy practice.

ResearchBOT represents a promising approach to addressing research capacity gaps among healthcare professionals, particularly in resource-constrained settings. The platform's favorable acceptance suggests potential for broader implementation across healthcare disciplines. Future research should explore longitudinal outcomes, including actual long-term usage patterns, objective performance measures such as research productivity and quality, impact on research confidence and competence, and broader implementation across other healthcare disciplines and geographical regions. Additionally, comparative studies with other AI research support tools and qualitative exploration of user experiences would provide deeper insights into factors influencing adoption and sustained use.

The findings from this study support the potential use of ResearchBOT as a frontline tool to aid healthcare professionals in conducting research and may inform future enhancements to the platform to better meet user needs and expectations.

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