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Assessing the Critical Failure Factors of AI Chatbots for Research Using ISM Approach:
A Case of Philippine State University Researchers

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ABSTRACT

Despite the potential of artificial intelligence chatbots in overcoming the tedious tasks of research, scholars have considered critical failure factors before fully integrating such tool into the research process. While extensive works have comprehensively described these factors, none have explored their interrelationships in depth. Therefore, this paper applies interpretive structural modeling analyses to an actual case study of a university in the Philippines to understand the structural relationships among factors. It is found that the authors' lack of knowledge in the research field is the most influential factor. This implies that artificial intelligence chatbots must remain an auxiliary tool in research writing and authors must still possess the firsthand, necessary knowledge to serve as the main contributor of new knowledge in the field.

KEYWORDS

Artificial Intelligence, Chatbots for Research, Critical Failure Factors, Higher Education, Interpretive Structural Modeling

INTRODUCTION

Artificial intelligence (AI) chatbots provide multiple advantages in academic research, including automating repetitive tasks, offering writing and editing support, and promoting research equity by assisting nonnative speakers in overcoming language barriers (Ng et al., 2023). They also support monitoring, communication, memory, and emotional analysis, facilitating comprehension of complex data and user interactions (Balcombe, 2023). Despite these benefits, concerns persist regarding the ethical, practical, and security implications of adopting AI chatbots in educational and research

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systems (Cain et al., 2023; Kooli, 2023; Sobaih, 2024). Researchers have highlighted issues of accuracy, cyber-security, trust, and empathy in AI-led services, which may limit adoption (Eslami & Hooshmandi, 2023; Nadarzynski et al., 2019). To align more firmly with existing technology adoption and innovation management theories, it is essential to situate these concerns within broader frameworks, such as technology acceptance model (TAM), unified theory of acceptance and use of technology, and institutional theory, which highlight how perceived usefulness, perceived risk, organizational norms, and ethical climate influence actual adoption behaviors (Casquejo et al., 2020). These theoretical lenses help position AI chatbot hesitancy not only as an operational issue but as a deeper institutional and sociotechnical phenomenon.

In the extant literature, there has been no research work that explicitly investigated the critical failure factors (CFFs) involved in the adoption of AI chatbots for research, despite its relevance in the academic domain. The literature, by far, offers a wide range of conceptual discussion on the factors that hinder the adoption of AI chatbots. By systematically exploring the characteristics of CFFs, this study aims to bridge the existing research gap by categorizing and analyzing these factors in the context of academic research. Through an analytical and empirical investigation, the study seeks to provide valuable insights into the challenges faced by researchers in adopting AI chatbots and offer recommendations for mitigating these barriers. Following this line, the rest of the sections present the CFFs that encompass the major decision of fully implementing AI chatbots for research purposes. In addition, clarifying how these failure factors interact within institutional decision-making strengthens the practical relevance of the study, demonstrating how universities can translate theoretical insights into policy formulation, capacity-building initiatives, and responsible AI governance.

CFFS OF USING AI-BASED CHATBOTS FOR RESEARCH

In order to fully understand the interrelationships among the CFFs of AI-based chatbots used for research, this section outlines the description of these factors along with the current position of the literature with respect to its emergence. Furthermore, some known relationships among these factors, referred to in this study as CFF1–CFF9, are also presented as follows:

1. Trust: Generally, trust in any technology refers to it ability to assist users and provide an extent of reliability to the outputs generated (Bongo et al., 2020; Chen et al., 2023). Given the emergence of generative AI in research, biased outputs have been observed, thus leading to distrust and dissatisfaction of users. Consequently, it is emphasized that researchers must not trust AI chatbots and, therefore, validate its outputs to ensure quality of results (Sobaih, 2024). This is the primary reason for the apparent challenge in trust and transparency of using generative AIs in writing scientific research studies (Lucey & Dowling, 2023). On the other hand, it is important to note that trust remains a critical factor in their continuous use (Gkinko & Elbanna, 2022). While researchers actively engage with these tools, most do not find them trustworthy enough for academic purposes (Deschenes & McMahon, 2024). Trust in AI chatbots can be influenced by factors, such as the area of inquiry and the communicated purpose for their implementation (Aoki, 2020). In fact, in higher education, students' trust levels are affected by variables, like willingness to use, knowledge, and perceived usefulness (Wicaksono et al., 2024). In a different context, such as in healthcare systems, concerns regarding privacy and security in AI remain to be of utmost importance, particularly for generative models and applications (Feretzakis, Papaspyridis, et al., 2024). Such concerns prompt the use of essential methods, including differential privacy, federated learning, and homomorphic encryption, to safeguard sensitive information, as well as trustworthy AI that necessitates strong governance, openness, and adherence to regulations (Feretzakis & Verykios, 2024; Feretzakis, Anastasiou, et al., 2024). On the other hand, the European Union AI Act categorizes AI risks, implementing stringent security protocols for high-risk applications. An effective multidisciplinary approach—combining technical, legal, and ethical protections—is