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Predictors of Usability of a Mobile Intelligent Agent Information Provider for College Students

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ABSTRACT

This study determined the factors that influenced the usability of a mobile-based intelligent agent called "AskRed." The design-related factors were evaluated in terms of performance, accuracy, responsiveness, aesthetics, and completeness. The usability of the software was determined in terms of satisfaction and intention to re-use the software. The software received favorable ratings from the students. Experts' software evaluation recommended strengthening the design of the intelligent agent in terms of security, performance, completeness, and ease-of-use. Multiple regression analyses showed that performance and completeness influenced satisfaction and intention to re-use. Aesthetics and responsiveness influenced satisfaction but not intention to re-use. Responsiveness had a negative impact on satisfaction. The predictive powers of the regression equations are 58% and 73%. This study provided empirical evidence on the predictors of usability of an intelligent agent used in a university setting.

KEYWORDS

information, information processing, intelligent agent, mobile, natural language processing

INTRODUCTION

An intelligent agent is a "software program designed to act autonomously and adaptively to achieve goals defined by their human developers or runtime users" (p. 91, Haynes *et al.*, 2009). It is a program that can provide user-centric, personalized applications (Hussain, 2013; Shumanov & Johnson, 2021). The functionalities of intelligent agents have been applied in the field of education. For example, prior studies showed that intelligent agents were used as mentors (Baylor, 2000), library assistants (Liu, 2011; Talley, 2016), and intelligent agent support instructors (Li, 2007; Njenga, Oboko, & Omwenga, 2018).

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An emerging application of intelligent agents is improving school administrative services by providing information (Lee et al., 2019; Bendici, 2018). Through intelligent agents, schools can improve their communication channels, compliance with standards, and retention of students (Bendici, 2018). Integrating intelligent agents as information providers is consistent with the management goal of schools, i.e., to provide the students with the highest level of service (Seeman & O'hara, 2006). For instance, the intelligent agent can assist students in identifying pre-enrollment requirements, provide information related to financial aid, remind students about upcoming events, and locate school buildings (Bendici, 2018; Hussain, 2018; Lee *et al*., 2019). Because of these capabilities, intelligent agents could reduce the administrative workload of staff (Lee *et al*., 2019).

Despite the importance of intelligent agents in improving university services, very few studies have examined the factors that influence their use and usability in a university setting (Lee et al., 2019). A lack of understanding of the factors that affect chatbot usability may lead to an unusable chatbot, which may then lead to the discontinuance of its use. As pointed out by Janssen et al. (2021), chatbot usage failure is attributed to poor content, the wrong use case, and ignored user requirements. Thus, it is critical to understand the design factors and how they affect chatbot usability to ensure that the technology is optimally used. Understanding how these factors influence a chatbot's usability in a university setting could aid in identifying design aspects that meet the information needs of its users.

In light of this research gap, this study was conducted. The study developed AskRed (subsequently referred to as software) that could provide students with the information they need regarding the services, policies, and general information about the university. AskRed is a mobile-based intelligent agent that responds to college students' queries relating to the policies, services, and general information of the university. It serves as a platform that could serve as an access point for students' queries and inquiries through the use of their mobile devices. It can accept queries in the form of text or voice and perform the queries through the use of natural language processing (NLP). This chatbot could make it easier for students to gather information. It may also reduce the workload of university personnel who provide the information (Patel et al., 2019).

Moreover, the study identified the factors that influence the usability of AskRed. Toward this goal, this study sought answers to the following questions. 1) What are the design-related factors in terms of performance, accuracy, responsiveness, aesthetics, and completeness? 2) What is the usability of the software in terms of satisfaction and intention to re-use the software? 3) Do design-related factors influence the usability of the software?

The rest of this paper is divided into seven sections. The second section is the Literature Review section, which is divided into two subsections. The third section defines the research variables and states the null hypotheses. The fourth section, AskRed Architecture, describes the software's framework. The fifth section is Methodology, which is further divided into four sub-sections. The study's findings are presented in the sixth section. The performance and completeness of the chatbot were found to influence satisfaction and the intention of reuse. Aesthetics and responsiveness influenced satisfaction but not the intention to reuse. Responsiveness had a negative impact on satisfaction. These findings are then discussed in detail in the Discussion section. The eighth section ends with a discussion of the Conclusion, Recommendations, and Future Works.

LITERATURE REVIEW

Usability Measures and Design-Related Factors

Usability has no universal definition (Sindhuja & Dastidar, 2009) because it depends on the nature of the object under investigation (Granic *et al.,* 2011) and the context of use (Scheller & Kühn, 2015). Nonetheless, different studies attempted to propose a framework for evaluating usability. According to International Standard Organization (ISO) 9241 (ISO, 1998), usability is composed of efficiency (resources spent in performing tasks), effectiveness (the ability of users to complete tasks using