

The Effect of Customer Value on User Satisfaction With Dialogue Characteristics of Apple's Intelligent Agent Siri

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ABSTRACT

Intelligent agent products with dialogue characteristics are rapidly becoming common household and personal gadgets. The purpose of this study was to investigate the effect of dialogue characteristics on user satisfaction with intelligent agent products. The authors predicted that factors leading to this effect would differ from products without such interactive features. To date, dialogue characteristics have primarily been studied in robots with human-like gestures and appearance, but few studies have addressed dialogue characteristics in intelligent agent products designed for home or mobile usage. To address this gap, the authors conducted surveys about Apple Siri, a representative commercial intelligent agent. The results indicate that dialogue support had the most positive impact on user satisfaction, followed by playfulness and social presence. These findings suggest new directions in intelligent agent research and design that could increase user satisfaction.

KEYWORDS

Anthropomorphism, Customer Value Theory, Dialog Support, Intelligent Agent, Playfulness, Siri, Social presence, User satisfaction

INTRODUCTION

Agents are systems that automatically process a given task with decision making, learning, and autonomy (Jennings & Wooldridge, 1995; Kiesler, Powers, Fussell, & Torrey, 2008; Maes, 1994). In today's market for household and personal gadgets, intelligent agents with interfaces that permit user interaction are rapidly being commercialized. When using an interactive interface, consumers can imagine the personality of the agent or be emotionally affected through simulated conversation (Nass & Moon, 2000). Therefore, user experiences with an interactive, intelligent agent are likely to differ from user experiences with more traditional electronic devices.

Intelligent agents with dialogue characteristics feature an interactive user interface (UI) that permits naturalistic communication, allowing users to feel as if they were conversing with a real person. These dialogue characteristics are anthropomorphic. Anthropomorphism is the tendency to regard nonhuman agents as human beings and to attribute actual or imagined actions to objects (Epley, Waytz, & Cacioppo, 2007).

Previous studies on anthropomorphism have focused on visual characteristics such as the shape and gestures of a robot (Bartneck, Bleeker, Bun, Fens, & Riet, 2010; Darling, 2017; Epley et al., 2007; Eyssel & Ruiter, 2012; Kiesler et al., 2008; Salem, Eyssel, Rohlfing, Kopp, & Joublin, 2013; Tondou, 2012; Vallverdu, Nishida, Yoshisama, Moran, & Lazare, 2018; Waytz & Cacioppo, 2010).

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However, few studies have explored dialogue characteristics, the personifying feature of various intelligent agents currently being commercialized more rapidly than robots.

The aim of the current study was to investigate the effect of dialogue characteristics on user experiences with intelligent agents. Previous studies have addressed topics related to the technology of intelligent agents (Emary & Hassanien, 2011; Honarvar, 2013; Roger, King, Russ, Lambert, & Reese, 2001; Singh & Dave, 2013). However, the results of these studies did not address the relationship between user satisfaction and intelligent agent product design. Therefore, we proposed a solution to improve user satisfaction by investigating user experiences with intelligent agents. Our study also expands research on anthropomorphism; in the case of intelligent agents, the anthropomorphic element of intelligent agents is dialogue (i.e., audible), whereas the anthropomorphic elements of robots typically include appearance and gesture (i.e., visible). Finally, the current study suggests new directions for intelligent agent product design in order to improve user experiences with dialogue characteristics.

Using customer value theory as a framework, we explored user experiences with intelligent agents characterized not by human-like, physical characteristics (e.g., robots) but by human-like, conversational characteristics (e.g., voice-interactive smartphones). We categorized dialogue characteristics into three dimensions of value: dialogue support (functional value), playfulness (emotional value), and social presence (social value). These characteristics were the independent variables of the study. To collect data, we conducted surveys with people who used Siri, the intelligent agent on mobile devices designed and marketed by Apple.

THEORETICAL BACKGROUND

Intelligent Agents and Anthropomorphism

An intelligent agent is a system designed to accomplish tasks autonomously in a complicated and variable environment. An intelligent agent has (a) the autonomy to perform based on its own judgment and without direct instruction by another system, (b) the ability to cooperate through interaction with a person or another agent, (c) the responsiveness to perform appropriate work after detecting changes in the environment or the user, and (d) the initiative to resolve problems proactively (Jennings & Wooldridge, 1995; Maes, 1994). A more recent feature of intelligent agents is a UI that permits naturalistic, conversational interaction (e.g., Cortana on Windows 10, Siri on iPhone, and Echo on Amazon).

Enhancing a non-human object with an interactive UI is a form of anthropomorphism, which is the attribution of human characteristics to a product or system to make it feel more like a person (Aggarwal & McGill, 2007). Human beings are more likely to accept products with anthropomorphic qualities, to understand product features that resemble human behavior or appearance, and to feel psychologically motivated to interact with intelligent devices in lieu of other people (Aggarwal & McGill, 2007; Epley et al., 2007; Guthrie, 1993; Waytz, Heafner, & Epley, 2014).

Methods of anthropomorphism include two types: external and internal. External anthropomorphism is giving human-like form to an object, and internal anthropomorphism is to giving human-like emotion and behavior to an object. Research has also addressed how systems can interact with people through conversation, a form of social anthropomorphism (Brave, Nass & Hutchinson, 2005). Through an interactive UI, a user can imagine the personality of a system and, in turn, be affected emotionally.

Among previous studies on anthropomorphism, Kiesler et al. (2008) examined the influence of anthropomorphic robot features on social presence and interactivity. Another study found that users responded emotionally to interaction with a robot that was similar in appearance to a human being and perceived the robot to be more useful (Epley et al., 2007).

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