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Key functional characteristics in designing and operating health information websites for user satisfaction: An application of the extended technology acceptance model

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ABSTRACT

Objective: With growing demand for health information and rapid development of information technology, health information websites are emerging as the most effective media to meet the public's needs for health information. This article is intended to offer a technical view on the design and operations of health information websites. Along this line, employed here is the Technology Acceptance Model (TAM), which has been widely used to predict user acceptance based on Perceived Ease-of-Use (PEOU) and Perceived Usefulness (PU).

Methods: We extend the original TAM by including some exogenous variables since it is necessary to understand the role of the antecedents of acceptance constructs when designing an effective health information website for improving user satisfaction. This study focuses on identifying the core functional factors in designing and operating health information websites. Conducted are some multivariate statistical analyses based on data from an extensive survey.

Results: The results from the structural equation analysis suggest that functional characteristics should be categorized into three groups: one affecting PU and PEOU, another affecting only PEOU, and the other having no direct effect on either PU or PEOU. In particular, 'usage support' and 'customization' are two key functional characteristics in the extended TAM framework for health information websites.

Conclusion: Contrary to expectations, however, the direct effect of PEOU on usage support is hardly observed, which differentiates health information websites from other commercial websites like online shopping malls. As a result, understanding the antecedents of PU takes on more significance.

1. Introduction

Customers have relied on medical experts for health information as knowledge on medical service was perceived as medical expertise. With the living standards increasing and the supplier-oriented health care system switching to a customer-oriented one, customers are demanding a broader scope of medical knowledge, ranging from simple information related to better health to medical expertise. As consumer demand for health information grows, the Internet has emerged as a great information source. The Internet provides easy access to a variety of health information that was not available to the public in the past. Accordingly, health information websites have become the most effective medium for facilitating

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communication in the health care sector and satisfying the public's needs for health information.

Various sources have confirmed that health information websites play a vital role in providing health information to customers. In the US, for example, over 10,000 health information websites were created in 1997 and 15,000 in 2000 [1–4]. According to the American Society of Health System Pharmacists, around 100 million customers gain information on disease and medicine through the Internet [5]. In Korea, there were more than 5800 health information websites as of June 2005, and the number is still increasing [6].

Despite the need for and importance of health information websites, existing studies rarely present significant solutions to problems related to effective operations of health information websites. The studies focus only on demand side and are limited in their guidance to website operators. To overcome this limitation, the technical or functional side of the service provision should be explicitly considered. This study explores factors affecting adoption, diffusion, and actual use of health information websites from the perspective of both the user and the provider, in order to provide solutions for better operations.

Employed here is an application of Davis' Technology Acceptance Model (TAM, [7–10]) which is one of the most frequently employed methodologies for studies on the adoption of new Information Systems (IS). Even though there have been many studies on the application of TAM to IS, like Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM), health information websites are fundamentally different from those task-oriented IS. In particular, we extend the basic TAM to study key technical features or functional characteristics affecting the use of health information services through Internet websites. To our knowledge, there have been no studies conducted on applying the extended TAM to the design or operations of health information websites.

This paper begins with identifying key functional elements required to satisfy users of health information websites. Specifically, it derives key functional characteristics (FCs) for website design and operations, and employs FCs as exogenous variables in the extended TAM. Using the extended TAM and a series of structural equation analyses, key success factors in implementing and running health information websites have been developed. Moreover, this study is designed to derive meaningful implications on the public's acceptance and use of health information websites from both a theoretical and a practical viewpoint.

2. Background

2.1. *Health information over the Internet website*

With the average income level rising and medical technology developing, the focus of health care is shifting from disease treatment to health promotion and preventive medicine. Accordingly, the supplier-centered health care system is rapidly turning into a consumer-oriented system. Adapting to such a changing environment, consumers are more inclined to make decisions and take responsibility for their health on their own [1,3,5,11]. Thus, health information providers should be able to identify customer needs from the customers' perspective and define the type of health information that meets customers' needs so that they can provide sound health information.

The number of health information websites is on the rise. The number of websites offering health-related information around the world was estimated at 100,000 or more in 1999 [12]. In the US, for example, about eighty percent of Internet users are looking for health-related information online, with growing interest in diet, fitness, drugs, health insurance, experimental treatments, and particular doctors and hospitals [1,3]. Furthermore, the percentage of Korean adults who have searched the Internet for health information was 84.4% in 2003 and is still increasing [13]. The high accessibility to online health information is due to the rapid increase of the number of health information websites. In Korea, for instance, there were 5780 health information websites as of November 2004, which is 7.7 times higher than 747 sites as of October, 1999 [14]. Health information provided through the Internet is easier to access and more interesting than text-oriented, one-way knowledge transfer [15]. Health experts and customers are acquiring a tremendous amount of information free of charge through the Internet that was not available in the past. Easy access to a variety of information facilitates communication and decision-making in the health care sector (for example, refer to [1,3,5]).

However, given the significant amount of information provided by health information websites, information management and distribution in terms of service quality is lacking both in and outside Korea. In fact, trustworthiness of health information websites often comes into question as some health information websites provide misleading information or hype for which accountability is unclear [16,17]. As such, the need to address such a problem and evaluate and manage health information websites is growing.

In this context, frameworks to evaluate the quality of health information websites have been developed. There have been some research efforts made recently (for example, [18]), but these efforts have yet to create tangible outcomes compared to other studies on website service quality in Korea. Most studies on health information websites are thought to be focused on the contents of health information on the Internet and the functional features required for suppliers in order to provide such information [16,17], leaving out service elements that customers demand. There should be in-depth research on service elements as well as functional characteristics that customers deem critical, such as convenience, response to service use, trustworthiness, etc., in order to evaluate health information websites in a structured manner.

Besides theoretical research, various tools and programs have been developed to evaluate health information websites for practical purposes. The following is a brief description of the third party certification program and the health information evaluation system. The purpose of the third party certification program is for a third party to present appropriate quality management criteria for websites and evaluate them. Such a program provides various methodologies and approaches for information providers including evaluation items presented by Healthroad, which is primarily for medical staff and groups [19]. Another example of a health