MODELING PREDICTIVE FACTORS OF ONLINE HEALTH INFORMATION USE BY URBANIZED MALAYSIAN WOMEN

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ABSTRACT

As people become aware of health issues and realize their personal responsibility for their health, the Internet plays an important role as a source for health information. Although the number of online health information consumers has increased over the years, there are limited studies regarding online health information use by Malaysian consumers, particularly among women. People in urban areas involve in online health information seeking activity more frequently compared to people in rural areas. Therefore, the aim of this study is to investigate online health information use using urbanized Malaysian women as our study sample. Understanding the factors that contribute to online health information use in the selected scope will be beneficial for the group of people who will be affected the most. The study adopted a multi-methodological approach to information system (IS) research that integrates research model development, validation, and prototype development as a proof of concept and helps inform the research model. The study addresses three research objectives: 1) To identify factors for an enhanced research model that predict online health information use; 2) To develop an online health information use model based on the identified factors; and 3) To develop an online health information resource prototype based on the validated online health information use model. This study proposes an enhanced research model, Online Health Information Use Model (OHIUM), which consists of personal factors and online health information characteristics. Six personal factors reflect the online health information users, that is, health concern, perceived convenience, skill, health management, empowerment, and social support. Online health information characteristics consist of four factors; quality of website design, quality of content, accessibility, and credibility. Satisfaction was a mediator between online health information characteristics and online health information use. Data collection was

conducted online by means of a survey questionnaire resulting in 396 completed returned responses. Using the data, OHIUM was tested and the findings provide support for the hypothesized relationships and predictive value of the model. Partial Least Squares (PLS) path modeling and descriptive analysis were used for data analysis. It was found that a total of 84% respondents reported the Internet as the main source of health information followed by doctors or advise from health professionals with 72%. The users commonly searched information for themselves (42%) and their families (40%). Factors that affect online health information use by urbanized Malaysian women are; satisfaction, empowerment, perceived convenience, health concern, and skill. Satisfaction was predicted by credibility, accessibility, and quality of content. OHIUM explained 71% of the variance in online health information use and 24% of the variance in satisfaction. It is undeniable that because online health information has great potential in helping users, it is required for the design to better suit its users' needs. Therefore, the significant factors of validated OHIUM was incorporated into the design of Online Health Information Resource (OHIR) prototype. Data analysis of prototype evaluation show that convenience, empowerment, quality of content, credibility, and accessibility of OHIR prototype was highly perceived by participants.

ABSTRAK

Masyarakat semakin menyedari tentang isu-isu kesihatan dan tanggungjawab peribadi mereka dalam hal-hal yang berkaitan dengan kesihatan. Oleh yang demikian, Internet telah menjadi sumber penting untuk memperolehi maklumat berkaitan kesihatan. Walaupun terdapat peningkatan dari segi penggunaan maklumat kesihatan secara atas talian, kajian mengenai penggunaan oleh penduduk di Malaysia terutamanya golongan wanita adalah terhad. Penduduk di kawasan bandar menggunakan maklumat atas talian dengan lebih aktif berbanding penduduk di kawasan luar bandar. Memahami faktor-faktor yang menyumbang kepada penggunaan maklumat kesihatan secara atas talian adalah penting dalam membangunkan sumber maklumat kesihatan yang bermanfaat. Oleh yang demikian, kajian ini bertujuan untuk mengenalpasti penggunaan maklumat kesihatan secara atas talian dengan menggunakan wanita Malaysia di kawasan bandar sebagai sampel kajian. Kajian ini menggunakan kaedah pendekatan metodologi pelbagai untuk kajian sistem maklumat yang menggabungkan pembangunan model, pengesahan model, dan pembangunan prototaip sebagai pembuktian konsep. Kajian ini menyasarkan tiga objektif iaitu: 1) Untuk mengenal pasti faktor-faktor bagi model penyelidikan yang dipertingkatkan bagi meramalkan penggunaan maklumat kesihatan secara atas talian; 2) Untuk membangunkan model maklumat kesihatan secara atas talian berdasarkan faktor-faktor yang telah dikenal pasti; dan 3) Untuk membangunkan prototaip sumber maklumat kesihatan secara atas talian berdasarkan model penyelidikan yang disahkan. Kajian ini mencadangkan satu model penyelidikan yang dipertingkatkan, iaitu, *Online Health Information Use Model (OHIUM),* yang terdiri daripada faktor-faktor peribadi dan ciri-ciri maklumat kesihatan. Enam faktor mewakili faktor peribadi adalah; *health concern, perceived convenience, skill, health management, empowerment,* dan *social support*. Ciri-ciri maklumat kesihatan terdiri daripada empat faktor; *quality of website design, quality of content, accessibility,* dan

credibility. *Satisfaction* merupakan perantara bagi ciri-ciri maklumat kesihatan dan penggunaan maklumat kesihatan secara atas talian. Pengumpulan data telah dilakukan secara atas talian melalui soal selidik kajian dan sebanyak 396 jawapan telah diterima. Analisis data membuktikan hipotesis dan nilai ramalan model *OHIUM*. *Partial Least Squares (PLS) path modeling* dan analisis deskriptif telah digunakan untuk menganalisis data. Keputusan mendapati bahawa sebanyak 84% responden melaporkan Internet sebagai sumber utama maklumat kesihatan diikuti oleh doktor atau golongon profesional dengan 72%. Para pengguna didapati mencari maklumat untuk diri mereka sendiri (42%) atau keluarga mereka (40%). Faktor-faktor yang mempengaruhi penggunaan maklumat kesihatan secara atas talian oleh wanita Malaysia di kawasan bandar adalah; *satisfaction, empowerment, perceived convenience, health concern,* dan *skill*. *Satisfaction* telah diramalkan oleh *credibility, accessibility,* dan *quality of content*. *OHIUM* telah menjelaskan 71% daripada varians penggunaan maklumat kesihatan secara atas talian dan 24% daripada varians dalam *satisfaction*. Tidak dapat dinafikan, maklumat kesihatan atas talian mempunyai potensi yang besar dalam membantu pengguna, oleh itu reka bentuk haruslah memenuhi keperluan pengguna. Oleh itu, faktor-faktor penting *OHIUM* telah digunapakai di dalam mereka bentuk prototaip *Online Health Information Resource (OHIR)*. Hasil analisis data menunjukkan bahawa *perceived convenience, empowerment, quality of content, credibility,* dan *accessibility* telah diterima dengan baik oleh peserta.

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LIST OF ABBREVIATIONS

OHIUM	Online Health Information Use Model
OHIR	Online Health Information Resource
UGT	Uses and Gratification Theory
TPB	Theory of Planned Behavior
TAM	Technology Acceptance Model
UMT	Uncertainty Management Theory
AT	Affordance Theory
PLS	Partial Least Squares
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
PCA	Principal Component Analysis
LIMs	Lay Information Mediaries

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CHAPTER 1: INTRODUCTION

1.1 Background of Study

Being in a state of good health is life's greatest gift. Human health and well-being are influenced by many controllable factors like diet and lifestyle, and uncontrollable factors such as age and genetics. The responsibility for personal health is not limited to staying fit and avoiding activities that can harm oneself but being knowledgeable in health related matters as well (Harris & Bella, 2010). Health information is important in the education of risks and benefits pertaining to health. According to the definition by Cullen (2006), health information is "any information related to the practice of medicine and healthcare. This includes knowledge of human anatomy, physiology and pathology, and the maintenance of good health and treatment of disease, as well as information related to patient care, such as patient records and epidemiological databases".

Health information is often encountered or actively sought by consumers. Information encountering occurs when a person comes across information although they are not in search for it (Pálsdóttir, 2010), whereas information seeking is usually regarded as a conscious effort to acquire information in response to some need or gap in knowledge. In information seeking, the type of information needed and the context of the need will guide the way in which the acquisition of information is carried out (Mukherjee & Bawden, 2012). In particular, health information seeking is a "process of identifying and utilizing relevant health information to establish a firmer sense of health status and to create social and cognitive conceptions of health" (Cotten & Gupta, 2004). It was driven by the need for knowledge in order to reduce anxiety caused by uncertainty levels in individuals (Kahlor, 2010). This study aims to understand online health information use. The term "use" not only refers to the search for information, but

covers the correlations between consumers and information sources, skills, information needs, context, and responses to the information (Hughes, 2006).

In general, the public obtain health information from sources ranging from doctors or other health professionals, print and digital media as well as family and friends (Cutilli, 2010; Geana et al., 2012; Oh, Kreps, Jun, Chong, & Ramsey, 2012; Van de Belt et al., 2013). Media sources such as radio and television provide a passive channel for promoting health campaigns. These sources however are not only expensive but they deliver limited information within its restrictions of time and space (Catalán-Matamoros, 2011). While doctor consultations or self-referencing books and other printed material may provide in-depth information, these sources may be time and cost constrained (Powell, Inglis, Ronnie, & Large, 2011). It's been found that medical consultations often bring about more lingering questions where some patients have difficulties understanding the medical terms (Zhang, Jones, Spalding, Young, & Ragain, 2009).

It has been common practice for doctors to decide the type of information that was relevant for the users in the current situation during their limited consultation time (Gan & Lim, 2010; Zhang et al., 2009). People are expected to seek out additional information if they needed more than what is provided by their doctors. With sufficient information at hand, a person may take appropriate steps in managing their own health (Suziedelyte, 2012). Furthermore, there has been a major change in the perception of healthcare from disease treatment to preventive health model, making it crucial for the public to take personal responsibility in prevention care and understanding their own health (Bandura, 2001). With the shift from dependence in healthcare professionals to the individual (Lee, Gray, & Lewis, 2010), health information enable the public to take action and encourage greater personal responsibility in maintaining good health.

In this digital age, information grow rapidly and its continuously changing. Technology such as the Internet allow the rapid dissemination of large amounts of information at any time and place. Therefore, health information available on the Internet offers an appealing solution to understanding health issues. The field of online health information is known as consumer health informatics. Several definitions of consumer health informatics can be found in the literature. The term was originally used at a consumer health IT developers conference known as "Consumer Health Informatics: Bringing the Patient into the Loop" in 1993. In the same year, at the annual meeting of the American Medical Informatics Associations, consumer health informatics was defined as "the study, development, and implementation of computer and telecommunications applications and interfaces designed to be used by health consumers" (Ferguson, 2001). Other earlier definitions also recognized the importance of computer information and communication technologies in providing health information to users (Bader & Braude, 1998; Brennan, 1999; Field, 1996; Jimison & Sher, 1995; Perry & Weldon, 2005; Rhodes, 2000).

The definition of Eysenbach (2000) perhaps most closely reflect the meaning of the specified field. According to the Eysenbach definition, consumer health informatics is "the branch of medical informatics that analyzes consumers' need for information; studies and implements methods of making information accessible to consumers; and models and integrates consumers' preferences into medical information systems". It is deemed as a challenging field as various disciplines intersect such as public health, health education and promotion, nursing informatics, communication science as well as library science in delivering health information in the digital age (Eysenbach, 2000). Therefore, it can be summarized that the definitions of consumer health informatics stress the importance of understanding and meeting consumers' needs in providing health information through digital technologies.

Users of online health information are not restricted to those with specific health conditions seeking information to their disease, but also the public interest in achieving optimal health (Lewis, Chang, & Friedman, 2005). Thus, "internet users who search for online information on health topics, whether as consumers, caregivers, or e-patients" (Fox, 2006) are recognized as online health information consumers. It is important to clearly define what constitutes an online health information consumer as there are groups of users in the literature identified as lay information mediaries (LIMs) who seek information on behalf or as the outcome of the experience of others (Abrahamson, Fisher, Turner, Durrance, & Turner, 2008) as well as patients as "individuals who are already ill" (Gibbons et al., 2011). Research focusing on specific groups such as LIMs or patients might be different from other user group with varying needs, behavior and motivation such as the desire to enhance knowledge as a result of curiosity, or to be kept abreast with the latest development in healthcare.

The use of online health information influences decision made with regards to health care and treatment (Beck et al., 2014; Gan & Lim, 2010; Gilmour, 2007; Warner & Procaccino, 2007) as well as in changing of action plans in health protection (Abrahamson et al., 2008; Takahashi et al., 2011). It aids in the public understanding of illnesses, in preparing discussions with doctors, obtaining information on doctors and healthcare facilities or in evaluating health related varying points of views (AlGhamdi & Moussa, 2012; Gauld, 2010). The opportunity for users to be anonymous makes the Internet a preferred source for health information (Han et al., 2010; Lewis, 2006; Powell et al., 2011). Some users prefer online sources on health issues they feel uncomfortable discussing openly (Bell, Hu, Orrange, & Kravitz, 2011; Berger, Wagner, & Baker, 2005; van Deursen, 2012). Furthermore, the Internet offers a wide variety of information that is convenient and accessible at a very low cost (Balka, Krueger, Holmes, & Stephen, 2010; Gan & Lim, 2010).

In the last decade, the Internet was considered as an alternative to traditional channels in providing health related information (Rains, 2007). Recently however, it has grown into a major source of health information particularly in developed nations (Beck et al., 2014; Caiata-Zufferey, Abraham, Sommerhalder, & Schulz, 2010; Fox & Duggan, 2013; McDaid & Park, 2011; Oh et al., 2012). In contrast, developing countries such as Peru (Garcia-Cosavalente, Wood, & Obregon, 2010), Saudi Arabia (AlGhamdi & Moussa, 2012), and Puerto Rico (Rutten et al., 2012) were far behind in adopting the Internet as a source for health information. Knowledge of the use of online health information in these countries are limited as there have been relatively little research on the subject.

1.2 Overview of Research Problem

In this section, issues related to women and health in Malaysia are highlighted followed by discussions of specific problems that led to this study. A report by the World Health Organization (WHO) on the health profile of Malaysia indicate that the loss of lives caused by non-communicable diseases are much higher than losses caused by communicable diseases and injuries (WHO, 2014). Numerous reports on health issues faced by women in this country depict a rather grim situation. Malaysia has been rated as the highest among Asian countries for obesity. Evidence showed a greater risk of being overweight and obese among women compared to men (Khambalia & Seen, 2010). Research findings estimated the prevalence of being overweight and obesity among women in Malaysia aged 20 and above is 48.6% (Ng et al., 2014). Obesity can lead to a range of health problems such as heart diseases, cancers, diabetes and other life-threatening conditions.

Cardiovascular disease is another main cause of medically-certified deaths among Malaysian women, with one in four dying of heart failure. Deaths from cardiovascular disease are twice as more common than cancers in Malaysia since 1999. Many women, especially those in the post-menopausal age, have no idea that they could be suffering from cardiovascular diseases as women rarely experience the classic symptoms of a heart attack such as chest pain. People are mostly unaware of early detections and symptoms of diseases until it is too late for cure (Selvarani, 2012).

The alarming situation in Malaysia particularly related to women's health is shown in a number of studies. Findings show that only 17% of women reported performing regular breast self-examination (Loh & Chew, 2011). The barriers in performing regular monitoring is due to the uncertainties in conducting the proper breast self-examination, lack of knowledge, fear of being diagnosed with breast cancer and dealing with the consequences (Al-Naggar, Al-Naggar, Bobryshev, Chen, & Assabri, 2011; Norsa'adah, Rahmah, Rampal, & Knight, 2012). Most women reported that they were never taught about the technique for performing breast self-examination and did not know when they should have a clinical examination (Loh & Chew, 2011).

Incidences of cancer in the country was increasing at an alarming rate from 32,000 new cases in 2008 to 37,000 in 2012 with the number expected to go up to 56,932 by 2025 if no action is taken (Panirchellvum, 2014). It was reported that 1 in 31 women in Malaysia are at risk of contracting breast cancer. According to Rosmawati (2010), the proportion of women in suburban areas utilizing mammography for early breast cancer screening is still low. Insufficient knowledge is often found to be the barrier in managing health and taking preventive measures.

Poor knowledge of human papillomavirus (HPV) and cervical cancer is often cited as the barrier in cervical cancer screening not only among Malaysian women in

urban areas but also in rural areas. A study on cervical cancer screening among urban Malaysian women found that the lack of accurate information, the fear and misconceptions of the procedures and its implications regarding Pap smear tests influence screening habits (Abdullah, Al-Kubaisy, & Mokhtar, 2013). Unawareness and concerns of side effects are among the barriers reported in HPV vaccination (Al-Dubai et al., 2010). A study among young women in rural Malaysia reported the majority have heard of HPV vaccination from friends, television, and the newspapers. The intention to receive the HPV vaccine was significantly associated with knowledge of cervical screening and cervical cancer risk factors, therefore, knowledge deficits need to be addressed since the lack of knowledge may lead to low risk perception and low acceptability of the vaccine (Wong, 2011).

The current health situation has consequences on the nation's healthcare costs. According to Malaysia National Health Accounts, the total health expenditure has increased from RM8, 303 million in 1997 to RM44, 748 million in 2013. As for household health expenditure, the figure has increased five times from RM2, 931 million in 1997 to RM17, 439 million in 2013 (Health Expenditure Report 1997-2013, 2015). The rising costs of health care calls for the empowerment of citizens to reduce health risks and decrease their reliance on health care services. Empowering people with health information and the incentive to lead a healthy lifestyle encourages them to monitor and take responsibility for their own health and others around them (Ng, Tengku-Aizan, & Tey, 2011).

Even though traditional sources such as doctors or other media provide valuable information, it is not always available when needed (Fogel, Albert, & Schnabel, 2002). Therefore, the Internet makes for a valuable tool in delivering health information (Dart & Gallois, 2010; Huang & Penson, 2008) and needs to be utilized as an effective

medium in enriching the public knowledge of health (Al-Naggar, Low, & Isa, 2010). However, there are issues concerning the use of online health information that need to be understood and addressed. For instance, in a study of Malaysian breast cancer survivors who use the Internet for information found that participants believed information on the Internet was not useful in improving their knowledge of health care issues. The researcher suggested that the users did not understand the importance of the Internet as a vital part of healthcare systems platform for information and communications. Further understanding of factors that might cause users to believe in such a way have not been investigated in the study (Muhamad, Afshari, & Mohamed, 2011). In another study on Malaysian cases of breast cancers, survivors reported that their reliance on the Internet have caused misunderstandings and 'feelings of being lost' thus hindering the further use of online health information in the self-management of breast cancer (Loh, Packer, Yip, & Low, 2007).

Several studies have focused on understanding women as health information consumers (Kim, Shah, Namkoong, McTavish, & Gustafson, 2013; Laz & Berenson, 2013; Marton & Choo, 2012; Yoo & Robbins, 2008) but many questions regarding their online health information activities remain unanswered. More analysis is needed among populations that have the highest potential to benefit from the Internet as a source of health information (Gibbons et al., 2011). Findings from this study can contribute to better understanding of what determines online health information use, especially among urbanized Malaysian women. Although the number of online health information consumers has increased over the years, there are limited studies regarding online health information use by Malaysian consumers, particularly among women. There is a need to analyze the situation in order to gain a better understanding of what is required by Malaysian online health information consumer and how resources can be developed that will meet their needs. This is in line with Eleventh Malaysia Plan 2016-2020 that is

focused on people-economy, with improved healthcare as one of its vital thrusts. Information and Communication Technology are an essential part of the strategy to improve wellbeing for all through the increase of information sharing for health awareness and prevention programmes (Eleventh Malaysia Plan, 2015).

Past studies have found various factors and research models that influence consumers' online health information activities. However, users have different reasons that make the Internet a preferable health information resource (Park, Chung, and Yoo, 2009; Shin and Yun, 2011). The lack of understanding suggests the need to examine various aspects associated with online health information use. Also, the limitations of the existing research models suggest the need for an improved model to better predict the use of online health information. The study will contribute to existing knowledge in the consumer health informatics field by examining the role of personal factors (i.e. health consciousness, health condition, perceived convenience, self-efficacy, health literacy, health management, empowerment, social support, and satisfaction) and the features of the online health information resources (i.e. quality of website design, quality of content, accessibility, and credibility) on online health information activities.

Understanding the nature of online health information use and its related issues are essential for developing effective consumer health information resources (Keselman, Browne, & Kaufman, 2008). Previous studies suggested the importance of identifying factors that determine consumers' use of online health information that make the Internet a preferable health information resource (Kalichman et al., 2006; Park, Chung, & Yoo, 2009; Shin & Yun, 2011). The various aspects that determined online health information use suggests the need to identify significant factors as users have different requirements that need to be considered when developing online health information resources (Geana et al., 2012; Yoo & Robbins, 2008). Therefore, this study aims to

integrate factors of users and online health information characteristics into a comprehensive research model to further understand the online health information use. According to Affordance Theory (Gibson, 1979), action was determined by the characteristics of users and the technological features. The theory may assist researchers to investigate how online health information consumers use online health information sources in relation to their needs.

1.3 Objectives and Research Questions

This research is motivated by the prospect of online health information being a significant source for health information consumers. This study aims to investigate the use of online health information by urbanized Malaysian women. Past studies have found various factors and research model that influence consumers' online health information activities. However, the predictive power of the existing research models is weak hence the suggestion to propose an enhanced research model for better prediction is needed. Therefore, the first objective and research question of this study are:

Research Objective 1: To identify factors for an enhanced research model that predict online health information use by urbanized Malaysian women.

Research Question 1: What are the possible factors for the enhanced research model that predict the online health information use by urbanized Malaysian women?

The second objective of this study is to develop an online health information use model based on the factors identified in the first objective. The focus of this effort is to

find the most relevant factors in developing an enhanced research model that predict online health information use. The specific research objective and research question are:

Research Objective 2: To develop an online health information use model based on the identified factors in Research Objective 1.

Research Question 2: How can an online health information use model be developed based on the identified factors?

A gap exists between identifying the factors and realizing it into a form of a usable online health information resources. According to Kim et al. (2012), Rozenkranz et al. (2013), and Czaja et al. (2013), future research should incorporate the relevant characteristics and factors in developing a more useful and user-centered online health information resource that satisfies users' needs. Understanding online health information use and factors associated with it is the key towards better implementation of online health information resources. Therefore, the significant factors will be taken into account in developing an online health information resource prototype. The third objective and research question of this study are:

Research Objective 3: To develop an online health information resource prototype based on the validated online health information use model.

Research Question 3: How can an online health information resource prototype be developed based on the validated online health information use model?

1.4 Overview of Research Methodology

This study adopted a multi-methodological approach to information system (IS) research (Nunamaker, Chen, & Purdin, 1990) as a comprehensive method to obtain answers to the research questions. The multi-methodological approach to IS research consists of four research strategies: theory building, observation, systems development, and experimentation. It was developed as an attempt to integrate a number of separate approaches as not one methodological approach should be sufficiently comprehensive, while accommodating design science through a systems development approach. Design science research has been an important paradigm of IS research (Hevner & Chatterjee, 2010; Kuechler & Vaishnavi, 2008).

Design science research in IS involves the construction of artifacts such as decision support systems, modeling tools, governance strategies, and methods for IS evaluation (Gregor & Hevner, 2013). There are two types of artifacts built in a design science research project: 1) conceptual artifacts such as constructs, models and methods, and 2) real system implementations as the optional instantiation of the conceptual artifacts. Conceptual artifacts does not emphasize on physical like the hardware components used in technical IS implementation. The real system implementations may serve as a proof of concept (Nunamaker et al., 1990) and may also be useful for the evaluation of the conceptual artifact. Design science research attempts to provide new innovative artifacts that address the unsolved problems or provide more efficient or effective solutions than previous attempts (Von Alan, March, Park, & Ram, 2004).

Since this research integrates theory building (conceptual framework), system development (prototyping), and observations (interview and survey), the researcher considered this as a suitable methodology in which the development of an artifact serves as a proof of concept and helps inform a theory-building phase. Theory building

includes the development of research model as a result of the literature review. Prior to the research model development, research problems were identified from the literature and the objectives and research questions were formulated.

Sequential exploratory mixed method was adopted as data collection approach (Hesse-Biber, 2010). In exploratory design, researchers collect qualitative data, analyze the data, and then build on the qualitative data for the quantitative follow-up. Qualitative data can be used to identify the types of questions that might be asked and to determine the items, variables or scales for instrument design in quantitative phase (Harrison & Reilly, 2011). Strengths of sequential exploratory mixed methods are described by Creswell and Plano Clark (2007) as straightforward to design, implement and report.

In the first phase, qualitative data were collected through structured interviews. The aim of the first phase was to define the research model proposed for this study. The second phase of the method was to validate the research model through quantitative data collections. Observation in terms of sample surveys was conducted to test the hypotheses thus validating the research model. Consequently, the factors that were found to be significant served as the guiding principle in developing the prototype. A well-grounded IS research require prototype development since the survey alone, even though useful, is not sufficient in testing and measuring the factors. In this research, the prototype is used as a proof-of-concept to demonstrate the validity of the research model. Finally, the results of the experiment or testing the prototype may be used to refine the concepts of the factors and theories from which the research model are derived. Also, the results can be used to improve the prototype.

1.5 Significance of Research

Although the number of online health information consumers has increased over the years, there are limited studies regarding online health information use by Malaysian consumers particularly among women. There is a need to analyze the situation in order to gain a better understanding of what is required by Malaysian online health information consumer. The study will contribute to existing knowledge in the consumer health informatics field by developing a comprehensive predictive model that takes into account the personal factors and the features of online health information resource.

Findings from this study can contribute to better understanding of what determines online health information use among urbanized Malaysian women and how resources can be developed that will meet their needs. Women were found to be the more active health information seekers compared to men (AlGhamdi & Moussa, 2012; Weaver et al., 2010; Yoo & Robbins, 2008; Yun & Park, 2010). Women seek health information not only for themselves but for someone else (Powell et al., 2011; Sadasivam et al., 2013; Urquhart & Yeoman, 2010). By improving online health information according to what is required, we can create a platform to empower its users and improve the capacity to use online health information resource effectively.

This study has implications for online health information design and development. This study may be one of few studies that attempts to investigate the factors and implement it in developing a prototype of online health information resource. Identifying and explaining relationships affecting users and the resource will be crucial for effective design. Developers can understand more of what users need when developing online health information resource. The research findings will contribute to the development of user-centered online health information resources and improve user-experience when searching for health-related information.

1.6 Thesis Structure

In line with the research activities, the in-depth details of each will be explained within the six chapters of the thesis. Synopsis of the chapters are as follows and Figure 1.1 shows research activities.

Chapter 1: Introduction

Chapter 1 provides an overview of the research area and context of study. The research problems are put forward and the objectives are provided. In finding the answers to identified problems, the researcher propose a research question for each of the objectives. The outline of the methodological approach adopted in this research is presented. The possible contributions of this study is also discussed in this section. Finally, the overall structure of the thesis is provided as an overview of the thesis content.

Chapter 2: Literature Review

Chapter 2 provides a comprehensive overview of the previous literature pertaining to online health information research. To identify the relevant articles, leading journals, databases, and reputable conference proceedings were searched. As this field of study is interdisciplinary and overlapping in nature, searches were conducted in other areas such as health communication, health education, telemedicine, clinical nursing, and public health. Backward search to identify prior articles and forward search to identify articles citing existing studies were carried out. By using this technique, the researcher are able to gauge the review for its thoroughness and that no further information is available.

The literature review begins with an overview of past research on online health information. The analysis continues with theoretical approaches and models developed

by past studies. The review also centralizes on purpose, prevalence, effect, and challenges related to online health information activities. Other main parts of the review analyze the user characteristics and online health information sources.

Chapter 3: Research Methodology

Chapter 3 describes the theoretical framework adopted in this study. The researcher propose an enhanced research model to predict the use of online health information among urbanized Malaysian women. The explanation of each factors existing in the model and the hypotheses of possible associations is presented in this section. Details of the methodological approach in use will be discussed in this chapter. The quantitative method was adopted to conducting data collection and analysis. Descriptions of each steps involved such as instruments development, sampling, data collection procedures, and data analysis method is provided in this chapter as well.

Chapter 4: Research Findings and Discussion

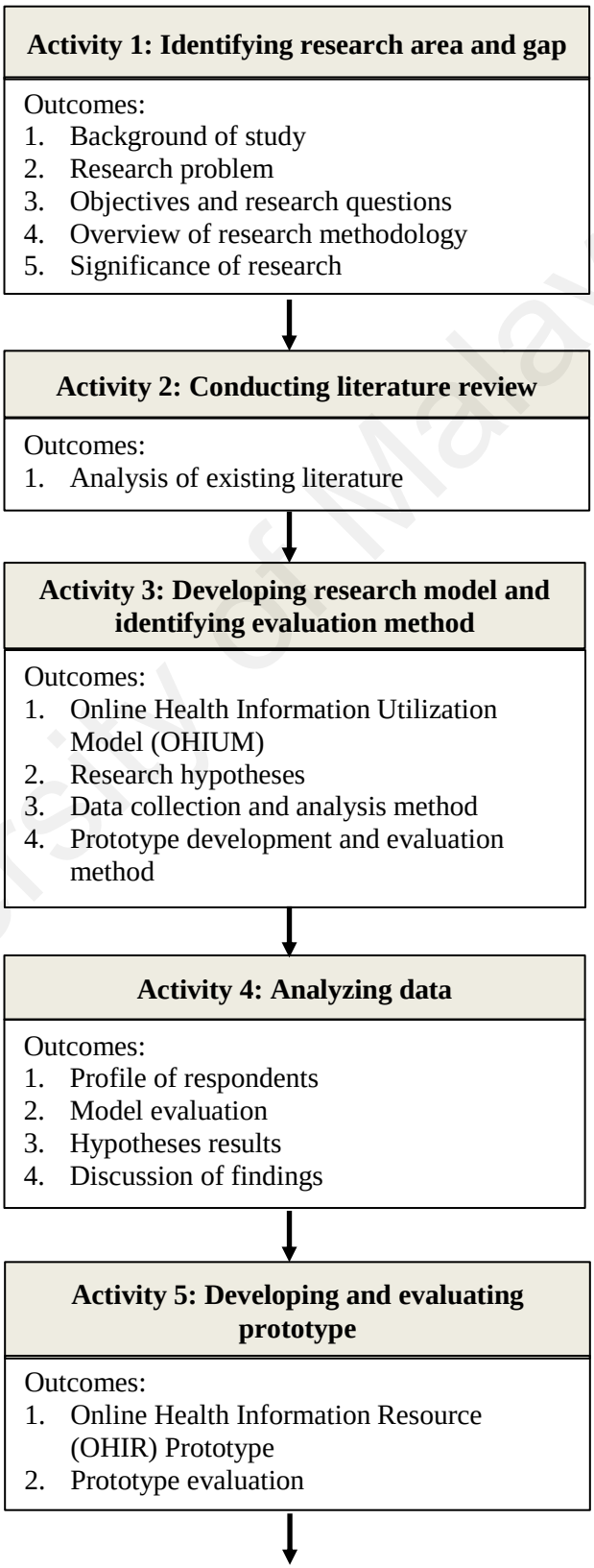
Chapter 4 presents results for factor analysis, hypotheses testing, and model evaluation. The research model is finalized based on the findings. The chapter includes demographic analysis of respondents. The chapter also presents the discussions of findings based on the objectives and research questions being asked in this study.

Chapter 5: Prototype Development and Evaluation

Chapter 5 covers the development and evaluation of online health information resource prototype. The significant factors of a validated research model are implemented in designing the prototype.

Chapter 6: Conclusion, Limitation, and Future Work

In chapter 6, research contributions and implications to the field of study is highlighted. The limitations in this study and direction for future research concludes this chapter.



Activity 6: Summarizing research outcomes
Outcomes: 1. Conclusion of findings 2. Implications 3. Limitation and future works

Figure 1.1: Research activities

CHAPTER 2: LITERATURE REVIEW

2.1 Overview of Literature

The purpose of this chapter is to summarize and present assessments on what has been done in this field of study. The scope of review involves the theoretical approach being applied, research models, online health information use, characteristics of online health information consumers and online health information resources. By identifying and comparing related theories, research models, hypotheses, and findings from studies, the researcher are able to examine similarities and differences from past research. From the review, the researcher are able to identify aspects that were overlooked and information that is yet to be collected or examined. It enables the researcher to position this study as an effort to fill the gap and to propose research questions yet to be answered. Subsequently the researcher are able to derive new conclusions, propose contributions from the investigations and position this study in a greater context.

2.2 Theoretical Approach and Research Model of Previous Studies

In this section, the researcher will identify and discuss the theoretical background and research model developed by previous researchers in this field of study.

2.2.1 Uses and Gratification Theory

Numerous studies have made attempts to explain the interactions between Internet usage for health information with Uses and Gratification Theory (UGT). UGT was developed by Katz, Blumler and Gurevitch in social and psychological field as an extension of Maslow's needs and motivation theory (Katz, Blumler, & Gurevitch, 1974). The principles behind use and gratification can be summarized as: "(1) the social

and psychological origins of (2) needs which generate (3) expectations from (4) the mass media or other sources which lead to (5) differential exposure (or engaging in other activities), resulting in (6) need gratification and (7) other consequences" (Katz et al., 1974). UGT describes the way people select media to satisfy their needs and expectations (Jiang & Beaudoin, 2016; Ko, Cho, & Roberts, 2005; Stafford, 2008).

The theory demonstrates active interaction between consumer and media in terms of the manner consumers utilize the media as oppose to perceiving the consumer as simply passive recipients of the media content. The assumption behind the theory is that differing consumer objectives motivate active involvement in media selection to fulfill individual goals (Chen & Corkindale, 2008; Ko et al., 2005; Williams, Philips, & Lum, 1987). The nature of the Internet that require a significant level of initiative and interactivity (Ko et al., 2005; Lagoe & Atkin, 2015) justify the relevance of UGT in research associated with Internet usage.

In a study conducted by Cudmore, Bobrowski, and Kiguradze (2011), they compare two award winning medical websites with two top commercial healthcare websites in an effort to determine significant predictors of positive attitudes towards these websites while actively searching for healthcare information. Evidence shows that quality of websites and ease of use were the dominant predictors of positive attitudes toward the websites. Also, the respondents show a positive perception towards commercial healthcare websites as compared to hospital-based websites.

It was determined that unmet needs with other medium influence the use of the Internet for health information. Tustin (2010) combined UGT and Media System Dependency to investigate the relationship between patient care satisfaction and online health information seeking. The study reported that dissatisfied patients were significantly more likely to rate the Internet as a better source of information than a

healthcare provider. Lee and Hawkins (2010) explores unmet needs for information and emotional support in predicting the use of e-health system. It was found that the higher the unmet need for information, the more likely individuals would spend time in search of specialized health information and the higher the unmet need for emotional support, the more likely individuals would spend time in social support services such as discussion groups. Several other studies have attempted to integrate UGT with another theory. Rains (2007) combined UGT and Comprehensive Model of Health Information Seeking. The findings show that perceptions towards traditional information sources influenced the use of Internet for health information. Distrust in healthcare providers as a source of health information increased the use of online health information however it also increased the likelihood to rate health information from online searches as useless.

2.2.2 Theory of Planned Behavior

Theory of Planned Behavior (TPB) was proposed by Ajzen (1985), is an extension to the Theory of Reasoned Action (TRA). According to the theory, Attitude Toward Behavior (ATT), Subjective Norms (SN), and Perceived Behavioral Control (PBC), determine an individual's intentions and behavior. ATT is an individual's positive or negative evaluation of self-performance of a particular behavior. SN is an individual's perception about a particular behavior, which is influenced by the judgment of those who are important to the person, for instance, spouse, parents, or friends. TPB differs from the TRA in its addition of the PBC, which refers to individual's perceptions of their ability to perform a given behavior. PBC influence both intention and behavior and the effect of PBC on behavior can be direct or interactive. The main factor of TPB is the individual's intention to perform a given behavior that indicates individual's readiness to perform a given behavior based on ATT, SN, and PBC (Ajzen, 1991).

Based on this theory, Heart and Kalderon (2011) assessed older adults' readiness to adopt health-related ICT. Evidence shows that attitude and subjective norm did not affect health-related ICT use, although both significantly interacted with age to affect use. Only PBC emerged as significantly affecting intention to use. Adoption of technology is still limited among older adults. The main reason for non-use was 'no interest' or 'no need' leading the researchers to conclude that older adults are not yet ready to adopt health-related ICT. Currently, the results do not fully support the use of health-related ICT among older adults unless the technology is kept simple, perceived to be useful, and provided with support (Heart & Kalderon, 2011). However, in a study that investigated parents' decisions to use online health information for child health care found that attitude, subjective norm, and perceived behavioral control, were the significant predictors of intention (Walsh, Hyde, Hamilton, & White, 2012). The intention to use online health information was to diagnose and/or treat their child's suspected medical condition and to increase understanding about a diagnosis or treatment recommended by a health professional.

Yoo and Robbins (2008) combined UGT and TPB to examine how and why middle-aged women use health-related websites. Intention to use a health-related website is the dependent variable of the proposed model, Health-related Website Use Model. The action was driven by the ease to find information at any time, to get information about diseases, as well as information on medications. The proposed research model suggested that users are more likely to access health-related websites if they have a more positive attitude, stronger motivations, and higher confidence towards the ability to use health-related websites. The results show that searching for health information from websites was determined by attitude and motivations or gratification sought rather than users' confidence in using them. The gratification sought and attitudes predict behavioral intentions better than perceived behavioral control of TPB

in seeking for online health information among middle-aged women. Research model by Yoo & Robbins (2008) explained 50% of variance in intention to use online health information.

2.2.3 Technology Acceptance Model

Another theory used in online health information study is Technology Acceptance Model (TAM). Davis (1986) introduced TAM as an extension of TRA, which described an individuals' acceptance of information technology. The goal of TAM is to provide an explanation of the determinants of computer acceptance among users. TAM replaced TRA's attitude beliefs with the two technology acceptance measures. TAM does not include TRA's Subjective Norms (SN) as a determinant of Behavioral Intention (BI). Perceived ease of use (PEOU) and perceived usefulness (PU) are the two main determinants of attitudes towards the adoption of information technologies in TAM.

As defined by Davis (1989), PU is the degree to which a person believes that using a particular system will enhance his or her job performance. PEOU refers to the degree to which a person believes that utilizing a particular system will be free of effort. TAM posits that PU is influenced by PEOU because, the easier to use a technology, the more useful it can be, considering other things are equal. TAM has been proven many times for explaining why users accept and adopt information technologies due to its simplicity and generalization (Marangunić & Granić, 2015). The theory, however, is lacking of accuracy and salience for a specific product adoption (Tate & Evermann, 2009). Benbasat and Barki (2007) points out that the theory does not extend the knowledge to a broader or more specific set of relationships, especially those concerned with information technology design. Kim and Chang (2006) attempted to provide technical view on the design and operations of health information websites. The study

focuses on identifying the core functional factors in designing and operating health information websites. The result shows that direct effect of PEOU on usage support is hardly observed.

Several studies have found that TAM is more beneficial in predicting the use or acceptance of online health information with several additions and modifications. Yun and Park (2010) investigated the factors affecting consumers' disease information seeking behavior on the Internet in Korea by extending TAM with four additional variables. In Yun and Park (2010) research model; health consciousness, perceived health risk, and Internet health information use efficacy were hypothesized to influence consumers' beliefs, attitude, and intention to use disease information on the Internet. Health consciousness, perceived health risk and Internet health information use efficacy were found to influence consumers' beliefs, attitude, and intention of use disease information on the Internet. But Internet health information use efficacy did not significantly influence perceived usefulness. It was also identified that consumers' perceived credibility of the information in the websites was the main determinant in forming of attitude towards disease information on the Internet (Yun & Park, 2010).

Another study attempted to explain how perceived ability affects users' acceptance of online health information in Korea (Kim et al., 2012). The authors suggest that perceived ability (subjective health knowledge and Internet efficacy) of users is related to their acceptance of online health information. TAM was adopted and extended by adding external and mediating variables. In the research model, perceived ease of use, perceived usefulness, and perceived credibility acts as a mediator between perceived ability and intention to use online health information. The study found that perceived ease of use, perceived usefulness, and perceived credibility significantly affect how individuals use online health information. Subjective health knowledge and Internet efficacy have strong indirect effects on users' attitude and intention to use

online health information with perceived ease of use, perceived usefulness, and perceived credibility as mediators. Subjective health knowledge and Internet efficacy, was confirmed as a prerequisite for health information use on the Internet (Kim et al., 2012).

2.2.4 Uncertainty Management Theory

Uncertainty management theory (UMT) suggests that people reduce health-related uncertainty by increasing their understanding of disease or treatment options, improving patient-doctor communication, and enhancing knowledge of disease self-management through health information seeking (Rooks, Wiltshire, Elder, BeLue, & Gary, 2012). UMT was applied in Rains (2014) study to offer theoretical explanation for how individuals use the Internet to acquire health information and to help better understand the implications of online health information seeking. Consistent with study predictions, use of the Internet for health information seeking interacted with respondents' desired level of uncertainty to predict their actual level of uncertainty about cancer prevention (Rains, 2014).

2.2.5 Information Foraging Theory

Information Foraging Theory hypothesizes that users' search is motivated by their information needs and the search persists if the new information is relevant and useful. It suggests that information seekers tend to maximize the information gained when facing multiple information sources (Pirolli, 2007). Based on the assumptions of this theory, Xiao et al. (2014) examines the impacts of IT enablers and health motivators on users' online health information search behavior. Users' online health information

search behavior was defined in three dimensions: the frequency of online health information search, the diversity of online health information usage, and the preference of the Internet for initial search. Research model by Xiao et al. (2014) consists of access, trust, perceived health status, and communication quality with doctors as factors associated with the three dimensions of search behavior.

Results indicate that ease of access to Internet services and trust in online health information could affect the three dimensional search behavior. Perceived quality of communication with doctors has an impact on diversity of use and preference of use, but not on the frequency of search for online health information. Perceived health status could affect both frequency and diversity of search for online health information. The evidence did not support the hypothesis that perceived health status could lead to a preference for using the Internet as a source for health information (Xiao et al., 2014).

2.2.6 Affordance Theory

Affordance Theory (Gibson, 1979) describes a potential for action was introduced in the field of psychology. The term originally referred to the "capabilities for action as a product of the interaction between properties of the environment and characteristics of the perceiver" (Gibson, 1979). In more general terms, the action was determined by characteristics of both the perceiver and the environment. Another definition of affordances is "opportunities for action: the perceived and actual fundamental properties of a thing that determine how the thing could possibly be used" (Norman, 1988). Norman distinguished between two types of affordance; real and perceived affordances. Real affordances are those associated with the attributes of a physical object that afford or allow its operation. Perceived affordances, on the other hand, are those associated with the appearance of the object that give clues about its operation (Norman, 1999).

Affordances is useful in depicting the association between human and technology. In online learning context, affordances theory describes how attributes of online technologies interact with other elements such as learners, teachers, and the physical environment. In designing computer-supported collaborative learning (CSCL) systems, designers should utilize the opportunities provided by the technology and learned about its affordances (Suthers, 2006). Gaver (1991) emphasized on the connection between system design and affordances by stressing the need to optimize the strengths of the technology and mitigate the weaknesses. The approach can result in a system with high visibility of real and potential affordances, which is more likely to be accepted by users (Seet & Goh, 2012).

2.2.7 Other Research Models

Investigation pertaining to online health information has produced several other research models. Another study focusing on intention to use the Internet for health information investigating the intention to revisit health-related websites (Hong, 2006). According to the research model, reliance on the web for health-related information, relevance, and knowledge positively associated with credibility of the website. Intention to revisit a website predicted by the perceived website credibility. The model accounted for 24% of the variance are lacking of website characteristics as it emphasized more on user characteristics.

Lemire et al. (2008) examined the frequency of online health information search. Research model developed in this study focusing on perception of health-related websites. The model explained 35% of the variance in the frequency of online health information search. Consumer satisfaction and repeated search behavior model by Lee et al. (2009) consists of value-driven motivation and perceived quality dimensions of

online health information. Meanwhile, Park et al. (2009) developed a model with personal characteristics factors and quality dimensions of online health information, in order to understand the willingness to depend on online health information.

Evaluation of the preceding models shows a number of flaws. The highest predictive power of the existing model is 50%, proven through the model developed by Yoo & Robbins (2008), Health-related Website Use Model. Moreover, it can be seen that models developed based on theory such as TAM are lacking of factors assessing user characteristics and also situational factors. Similarly, research model by Xiao et al. (2014), could be more comprehensive if it considers user characteristics and preferences which may affect online health information search patterns.

As for the model by Lemire et al. (2008), it is lacking in factor related to motives in seeking for online health information. Integration of factors related to online health information characteristics in the model by Park et al. (2009) will be useful to examine consumers' health information searching behaviors. The limitations of the existing research models suggest the need for an improved model to better predict the use of online health information. Therefore, this study will consider to integrate various factors of consumers and online health information characteristics into a comprehensive research model to further understand the online health information use.

2.3 Online Health Information Use

2.3.1 Prevalence of Online Health Information Use

The prevalence of online health information use varies in different studies. Searching for online health information is a common in countries such as the United States (Fox & Duggan, 2013; Oh et al., 2012), United Kingdom (McDaid & Park, 2011), France (Beck

et al., 2014), and Switzerland (Caiata-Zufferey et al., 2010). Whereas, findings in other countries shows low level of acceptance and usage for example, in Japan (Takahashi et al., 2011), Saudi Arabia (AlGhamdi & Moussa, 2012), Peru (Garcia-Cosavalente et al., 2010), and Puerto Rico (Rutten et al., 2012). Studies that found the Internet as an alternative source for health information shows that the users rely on other type of sources. For instance, the Japanese rely more on television, newspapers, and magazines (Takahashi et al., 2011).

Regardless of the availability of online health information, health information users maintained their trust in the healthcare professionals. Studies in Saudi Arabia (AlGhamdi & Moussa, 2012) and Lithuania (Marazienė, Klumbienė, Tomkevičiūtė, & Misevičienė, 2012) found that doctors still remain as the most relied upon source of health-related information. Medical advice from doctors were the most trusted and primary source of information when making decisions (AlGhamdi & Moussa, 2012). Even though online health information empowered people and made them better informed but it was not seen as a replacement for healthcare providers. Often, health information found online complement the information obtained from brief consultation with doctors (AlGhamdi & Moussa, 2012; Ybarra & Suman, 2006; Zhang et al., 2009).

The comparison between online health information use in urban and rural areas was investigated by a number of studies. It found that Peruvians in urban areas are more likely to use the Internet for health information. Meanwhile, in rural areas people mainly prefer radio as a source of health information (Garcia-Cosavalente et al., 2010). Similar findings were also reported in a study by Sug, Hwang, Lee, & Jo, 2010. People residing in metropolitan area used health information on the Internet more than people from rural area did. As such, location is an important factor in determining the access to online health information.

The digital divide between urban and rural areas due to Internet diffusion lead to disparities in access and usage of online health information (Hale, Cotten, Drentea, & Goldner, 2010). As a consequence, the use of the Internet for health information seeking activity in rural areas remains restricted (McDaid & Park, 2011). Thus, other resources are much preferred in areas with limited Internet access. For instance, in a study of information sources used by rural women in Gombak, Selangor, it was found that mass media such as newspapers, magazines, television and radio are much favored over the Internet (Bakar, 2011).

2.3.2 Online Health Information Research in Malaysian Context

A number of studies have addressed the use of online health information in Malaysia. One of the research investigated online health information use in rural areas (Mohd-Nor, Chapun, & Wah, 2013). The study reported that people in rural areas realized the importance of the Internet as a source of useful information about illnesses but do not actively seek online health information due to limited internet access in those areas (Mohd-Nor et al., 2013). Another study examined the factors influencing the use of online sources by breast cancer survivors in Malaysia. It was found that breast cancer survivors who use the Internet to access information about health problems believed the information was not useful in improving their knowledge of health care issues. Factors that influence users to conclude that online health information is not useful was not investigated in the study (Muhamad et al., 2011).

Saad et al. (2013) investigated the comparison of online health information seeking behavior between employees of two companies. Findings from the study of employees in private sectors shows that online health information seeking behavior was driven by interest in information about lifestyle (i.e. diet, nutrition, vitamins or

nutritional supplements), experience with the Internet, and ease of understanding the information (Saad et al., 2013). Findings from studies relating to online health information activities in Malaysia is limited and insufficient for greater understanding of online health information use in this country.

2.3.3 Factors Determining Online Health Information Use

Various factors were found that determined online health information use. One of such factor is health condition (Hardiker & Grant, 2011). People look for online health information for personal health conditions after being diagnosed with an illness, undergone treatment, prescribed new medication, coping with a medical condition, or having insufficient information after a doctor's consultation (Mano, 2015; Fox & Purcell, 2010; Rice, 2006). Aside from a personal health condition, health information is sought as a result of the health condition of a known person (Rice, 2006; Sadasivam et al., 2013; Ybarra & Suman, 2006).

The Internet is an important information source for people living with chronic conditions (Hardiker & Grant, 2011; Siliquini et al., 2011). Information obtained online not only affected decisions on how to treat an illness or condition, but changed the approach to maintain health or the health of someone that is being cared for (Fox & Purcell, 2010; Ybarra & Suman, 2006). In order to better understand a disease or to help cope with health issues of loved ones, information for diagnosis or treatment were sought regardless of the stage of the disease (Renahy & Chauvin, 2006). Therefore, online health information access is not solely driven by personal health conditions but by health conditions of others as well.

Online health information affects health management in several ways. Decisions about doctors' visits and treatments, health care services and health behaviors were made based on the information found online (Medlock et al., 2015; Ziebland & Wyke, 2012). Other consequences of managing personal health using online health information is greater understanding of health issues (Fox & Duggan, 2013), thus improving users' understanding of specific conditions, diseases or treatments (Zhang et al., 2009) and encouraging people to lead healthy lifestyles through changes in diets and exercise (Mukherjee & Bawden, 2012). The level of health information needed vary due to differences in the way people control their health and make health-related decisions. Fortunately, the Internet enables access to health information based on personal needs.

Another important motivating factor in accessing online health information is the opportunity to avoid illnesses by seeking recommendations for living a healthier life (Kontos, Blake, Chou, & Prestin, 2014; Lemire, Sicotte, & Paré, 2008). It is also a source to investigate health or medicinal concerns as it can be used to obtain information for non-malignant ailments, for self-diagnosis or treatment, and to improve general well-being (Nölke et al., 2015; Renahy & Chauvin, 2006). The level of health information needed vary due to differences in the way people control their health and making health-related decisions (Krantz, Baum, & Wideman, 1980). Fortunately, the Internet enables access to health information based on personal needs. Consumers appreciate information found online; hence using it as guidance for personal health management (Gilmour, 2007). Individuals who have financial barriers to healthcare access, difficulty getting timely appointments with doctors, and conflicts with scheduling at clinics are more likely to search for general health information online than those without these access barriers. Among reasons cited were inconvenience for doctor visits (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005), lack of insurance that cover

professional advice, unavailability of doctors (Rice, 2006), therefore decreasing reliance on healthcare professionals.

The Internet may offer a low-cost source of health information and could help meet the heightened demand for health-related information among those facing access barriers to care (Bhandari, Shi, & Jung, 2014). Among the reasons to use the Internet over other conventional health information sources are the need to reduce costs and to save time (Renahy, Parizot, & Chauvin, 2010). Perceived external barriers to accessing information through traditional sources include the hesitance to bother doctors, difficulties in getting an appointment and travel distance to health centers (Powell et al., 2011).

Other factors that contribute towards online health information usage is perceived convenience. According to self-determination theory, perceived convenience is users believe that a technology or a system is helpful to their task completion (Chang, Yan, & Tseng, 2012). Time and effort saving are the two key factors that determine whether a product or service is convenient for a user (Berry, Seiders, & Grewal, 2002). Yoon and Kim (2007) defined perceived convenience as a level of convenience of time, place and execution that one perceives when involved with an activity. Time convenience refers to a level of convenience of time that one feels when performing a task. Place convenience refers to a level of convenience in performing a task regardless of the location. Execution convenience refers to a level of convenience toward execution that one feels when performing a task (Yoon & Kim, 2007). In the online environment, convenience was found to have a positive impact on online shopping (Jiang, Yang, & Jun, 2013) and participation in online course study (Hsu & Chang, 2013; Poole, 2000).

Another factor that contributes to online health information use is health literacy. Health literacy is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan & Parker, 2000). Health literate individuals must have basic skills (i.e. reading, speaking, writing), cognition (i.e. health motivation), and access to health information sources in order to successfully take care of their health (Jensen et al., 2010). Individuals with adequate health literacy do not have problems in accessing any type of health information sources, either in a written or verbal format (Gaglio, Glasgow, & Bull, 2012). Individuals with higher health literacy skills were more likely to use email, surf the Internet, use search engines, and seek out health information online (Jensen, King, Davis, & Guntzviller, 2010) compared to those with lower health literacy skills (Gaglio et al., 2012).

Individuals with low health literacy was found to have difficulty in accessing and using online health sources (Jensen et al., 2010; Neter & Brainin, 2012; Sarkar et al., 2010) resulting in reluctance to use health information and services (Nutbeam, 2008). It was reported that individuals with inadequate functional health literacy do not prefer online health information sources since they have difficulty in accessing and reading the material (Gaglio et al., 2012). Often, they could not make sense of information found (Papen, 2012).

Self-efficacy also plays an important role among Internet users in acquiring health information (Rains, 2008). Self-efficacy is concerned with individuals' beliefs in their capability in organizing and taking actions in any given situations (Bandura, 1995). Self-efficacy determines Internet adoption as using the Internet might be difficult for some people (Eastin & LaRose, 2000), especially those who are not technologically savvy. People with high self-efficacy expect favorable outcomes while people with low self-efficacy are pessimistic about their achievements. Self-efficacy levels can enhance

or decrease personal motivation as it shapes the outcomes people expect their efforts to produce. Greater self-efficacy will lead to increase in online health information seeking (Whitney, Dutcher, & Keselman, 2013) thus contributing to better health knowledge (Whitney et al., 2013). Despite the perception that the Internet is a useful resource for health information, consumers faced different challenges in navigating online health information sources and finding useful information. Confidence in personal abilities to use the Internet for a health-related purpose is needed to overcome the challenges and successfully find the required information (Rains, 2008).

Social support is another factor that influences health behaviors and affecting health status (Antypas & Wangberg, 2014). Social support is important to people dealing with similar health issues or to those overcoming health problems such as cancer (Lee & Hawkins, 2010; Yoo et al., 2013). Social support can be categorized into four functions: (1) emotional support-offering of empathy, encouragement, care, concern, or affection (Langford, Bowsher, Maloney, & Lillis, 1997; Slevin et al., 1996); (2) tangible support-the provision of financial assistance, materials, or amenities (Heaney & Israel, 2008); (3) informational support-offering of suggestions, advice, or useful information to someone (Wills, 1991); (4) companionship support-the presence of companions who gives someone a sense of belonging (Uchino, 2004; Wills, 1991).

2.3.4 Outcomes of Online Health Information Use

Undeniably, online health information may provide benefits as well as risks to online health information consumers. Online health information can potentially empower people and impact personal health management in several ways. Empowerment in healthcare is the ability to understand and increase control over, and to improve one's health status (Walker, 2012). Managing personal health using online health information

contributes to greater understanding of health issues, thus improving knowledge of specific health conditions, diseases, and treatments (Gilmour, 2007; Madathil, Rivera-Rodriguez, Greenstein, & Gramopadhye, 2015; Zhang et al., 2009).

Online health information consumers also reported changes in personal health behaviors, for instance, they visit doctors more frequently and improved care of personal health as a result of information found online (Beck et al., 2014). Moreover, online health information helped users in making decisions about treatments (Gilmour, 2007; Walker, 2012) and healthcare services (Ybarra & Suman, 2006). Other advantages include improved knowledge that led to attitude change towards lifestyle (Takahashi et al., 2011), giving up smoking, reduced anxiety over medical procedures and improved understanding of medical terminology (Abrahamson et al., 2008).

According to Ybarra and Suman (2008), searching for health information online can strengthen relationships between patients and doctors. Respondents reported feeling more comfortable with explanations given by doctors due to the additional information found online (Ybarra & Suman, 2008). Active users who search online for health information are better prepared to discuss issues with their doctors based on what they learned online. Most patients searched for related information before meeting up with doctors so they were better prepared to communicate areas of concern and were actively involved by asking meaningful questions during consultation (AlGhamdi & Moussa, 2012). Moreover, respondents reported that information found online was not provided by the doctor during visits thus complementing the information they received through consultations (Gauld, 2010).

Another advantage of online health information is user empowerment. Gibson (1991) defines empowerment as "the absence or decrease in feeling powerlessness, hopelessness and loss of a sense of control over one's life." The concept of

empowerment in health involves having knowledge about disease, individual's ability, and competency to make personal life decisions. Empowerment is considered as both a process through which individuals take control of their lives and in disease management (van Uden-Kraan, Drossaert, Taal, Seydel, & van de Laar, 2008). Empowerment involves intrapersonal and interpersonal changes, which can be described as consciousness, confidence and connection. Consciousness is identifying how one can assume a role of change. Confidence is a sense of personal power to change. Connection is involvement with others to bring about group change (Gan & Lim, 2010). Online health information could help health information consumers by assisting in assessing their illness, coping with associated pressure and stress, and facilitating their medical decision-making (Xiao et al., 2014).

Despite empowering users and changing the power balance between patients and their doctors (Townsend et al., 2015), some studies reported incidences where doctors were reluctant to discuss material that patients learned from the Internet (Silver, 2015). Healthcare providers should be open with their patients regarding online sources and provide clear guidelines on using these sources to their benefit (Gan & Lim, 2010). Undeniably so, health professionals play an important role in educating users on the reliability of health information websites, as well as how to interpret and integrate information found online with the care and advice received from medical experts (Maloney et al., 2015; Ybarra & Suman, 2006).

In spite of the advantages, studies also reported the downside of online health information use. For instance, participants reported feeling frustrated and overwhelmed with the amount of information to search through (Townsend et al., 2015). Reliance on online health information can increase health anxiety (Kim & Kim, 2009; Muse, McManus, Leung, Meghreblian, & Williams, 2012). Interestingly, Baumgartner and Hartmann (2011) compared the impact of reliable and non-reliable health websites on

health anxious and non-health anxious individuals. It was found that health anxious individuals experience more negative consequences compared to non-health anxious individuals if the information came from trustworthy governmental website. However, information from a less trustworthy website do not lead to greater worries among health anxious individuals. Other negative effects include the increase in healthcare cost due to the demand of unnecessary services by users and disrupting the time efficiency during consultation (Kim & Kim, 2009).

2.3.5 Challenges in Using the Internet for Health Information

Understanding the challenges that users encounter in using the Internet for health information is a prerequisite for developing effective consumer health information resources. Online health information come from different sources including government agencies, private organizations, websites owned by doctors or health practitioners, blogs, online support group and many more. Basically, anyone and everyone can upload information on the Internet. Being an unregulated and free-for-all space, users were exposed to misinformation and potential victims of online scam (Lewis, 2006).

Common challenges encountered in online health information seeking as reported by Mukherjee & Bawden, 2012 were the following: information overload, lack of monitoring of health websites, barriers to access such as membership or subscriptions, especially for academic journals and also no indicators to the reliability of health website content. Accuracy of online health information is another challenge faced by consumers (Gan & Lim, 2010). Online health information consumers also reported the difficulties to locate health information, article was written too technically or with too much jargon, health information is not specific to their needs, problems to determine the quality of health information and to predict the quality of health services based on

the information found (Abrahamson et al., 2008). According to Walker (2012), the Internet use can be hindered by design features such as the quality of information as well as the technical language being used.

All these challenges should be considered when analyzing how people use online health information. The comparison between adults and adolescent online health information consumers found that for adults, searching took a lot of effort, as compared with adolescent consumers. Middle-aged and older adults also stated they did not have enough time to find all the information they wanted. The study suggested that health websites designed for younger people should make information accessibility faster. Whereas, websites aimed at older adults should be easy to navigate, intuitive and provide more detailed information (Ybarra & Suman, 2008).

Without gatekeepers that filter online health information sources, searching for information can be a daunting task. Consumers must decide which content to select from thousands of search results. However, the challenges do not stop consumers from accessing online health information as benefits overweigh challenges, such as being able to obtain all the information needed online. More importantly is the ability to exercise one's own judgement when evaluating online sources with regard to its accuracy and credibility (Gan & Lim, 2010).

In this section, various aspects of online health information use were discussed. Findings from previous studies show that online health information use was more prevalent in developed countries compared to developing countries. People in urban areas involve in online health information seeking activity more frequently compared to people in rural areas. The number of studies in Malaysia was found to be limited. The outcome of this study will contribute to better understanding of online health information activity in Malaysia, particularly among urbanized Malaysian women. The

factors identified from the past studies contributed to development of the research model in this study.

2.4 Online Health Information Consumers

Online health information was primarily used by younger people (Bianco, Zucco, Nobile, Pileggi, & Pavia, 2013; Koch-Weser, Bradshaw, Gualtieri, & Gallagher, 2010; Siliquini et al., 2011; Takahashi et al., 2011) and more frequently consists of people among the 30–39 year age group (AlGhamdi & Moussa, 2012). Older user groups reported less likely to use the Internet for health information (Ybarra & Suman, 2008) as they prefer to use other forms of media for the same purpose (Kim & Chang, 2006).

In terms of education and income, online health information consumers were found to have higher education levels and higher income (AlGhamdi & Moussa, 2012; Bianco et al., 2013; Koch-Weser et al., 2010; Sug et al., 2010; Takahashi et al., 2011). In a study of non-native English speaker (i.e. Korean Americans) health information seeking behavior, respondents with higher education and English proficiency were more likely to seek health information online. Korean Americans with less education and lower income were found to rely on Korean ethnic magazines and newspapers as source of health information (Oh et al., 2012).

Gender differences could explain the variations in health perceptions and Internet usage among men and women. For instance, a study conducted by Mukherjee and Bawden (2012) found that female participants searched for health information at least once every 3 to 6 months, while male participants reported they "never" or "hardly ever" do so. Moreover, women associate stronger feelings with the benefits of searching for health information and they are more willing to discuss information found on the

Internet with their doctors (Bidmon & Terlutter, 2015; Fallows, 2005). Women are more concern over family health matters and have tendencies towards caring for others (Andreassen et al., 2007; Ybarra & Suman, 2008; Yun & Park, 2010). For instance, mothers have a bigger role in understanding or treating their children's health compared to their partner (Walsh et al., 2012). Clearly, the differences in gender roles is extended from offline to online activities (Helsper, 2010).

Moreover, it was found that women prefer to wait before going to see a doctor (Renahy et al., 2010). They are more likely to gather information before seeking professional help. As an example, the fear and sense of denial when women detect irregularities with their breast that could be cancer prevented them from seeking medical advice from doctors immediately. Instead, they search for information from friends and relatives, brochures, books, and the Internet before decided to go for actual medical consultations (Gan & Lim, 2010; Ingram, Cabral, Hay, Lucas, & Horwood, 2013).

Ek (2013) suggest that research in health information behavior should be more sensitive to gender differences. Even though women are always eager to search for health information, its been reported that they are more likely to face challenges in using computers and the Internet (Bujała, 2012; Imhof, Vollmeyer, & Beierlein, 2007). Evidence suggests that the differences in comfort and self-efficacy in using the technology are gender related. For women, the process of finding information require a lot of time and effort (Broos, 2005; Kimbrough, Guadagno, Muscanell, & Dill, 2013).

Review of existing studies in this section demonstrates that online health information use was prevalent among younger people with higher level of education and income. In terms of gender, female users are more common than male due to higher interest in seeking for health information (Bidmon & Terlutter, 2015; Rutter, Mytton,

Ellis, & Donaldson, 2014; Ek, 2013). This study is particularly important for women, especially in Malaysian context due to various health issues faced by women in this country, for instance, cardiovascular diseases (Selvarani, 2012), cancers (Panirchellvum, 2014), and obesity (Ng et al., 2014; Khambalia & Seen, 2010).

Several studies have found that Malaysian women did not have sufficient knowledge that might help with early detection such as breast self-examination (Loh & Chew, 2011; Rosmawati, 2010), misconceptions of Pap smear tests (Abdullah, Al-Kubaisy, & Mokhtar, 2013), and unawareness of HPV vaccination (Al-Dubai et al., 2010; Wong, 2011). Besides, it was found that misunderstandings of online health information among women (Loh, Packer, Yip, & Low, 2007) and also the perception that online health information was not useful in improving knowledge of health issues (Muhamad, Afshari, & Mohamed, 2011) hinders the use of the resource in health self-management.

Health information is a vital tool for promoting health and in persuading habitual changes that can lead to improving quality of life. Understanding health risks and the effects of health behavior is essential in making behavioral changes (Bandura, 1997). Inability to locate reliable and comprehensible health information contributes to insufficient health care. Those who do not seek out health information are less informed and less determined to change their health behavior (Pálsdóttir, 2010). Therefore, people who seek out health information are more in control of their well-being. Equipping oneself with health information has become increasingly important in order to encourage changes in health behavior and preventing the incidence of illnesses.

2.5 Online Health Information Resource

2.5.1 The Internet as Source of Health Information

Searching for online health information is often time-consuming due to the infinite amount of information to choose from thousands of search results (Mager, 2009; Mukherjee & Bawden, 2012). Online health information is not only unorganized and unregulated but also differs in its relevance and quality (Damman et al., 2012; Grewal & Alagaratnam, 2013; Lewis, 2006). Health information consumers often find it difficult to understand article written with medical jargon and searching for health information specific to their needs (Abrahamson et al., 2008). According to Laurent and Vickers (2009), health information consumers usually start their search with Google or Wikipedia instead of the reliable health information sources.

Navigating online health information and determining what to trust was regarded as a "common sense" activity (Powell et al., 2011), thus consumers could hardly remember which websites they actually visited (Mager, 2009). This has caused confusion and anxiety especially for those with lack of Internet-related skills needed in searching for reliable online health information effectively (van Deursen, 2012). It was found that online health information consumers do not look further than the first page of search results (McTavish, Harris, & Wathen, 2011). This search tactic not only exposed them to sources linked to commercial interests but they could possibly overlook high quality information in the subsequent pages (Galarce, Ramanadhan, & Viswanath, 2011).

Previous research has attempted to provide better solutions in searching for online health information through designing better query for health information retrieval (Soualmia, Prieur-Gaston, Moalla, Lecroq, & Darmoni, 2012; Zeng et al., 2006), recommender system (Wiesner & Pfeifer, 2014), and tool to assess and filter online

health information (Eysenbach & Thomson, 2007). However, these approaches tended to focus on query processing and guidelines for online health information searching. It is necessary to integrate consumers' need and online health information characteristics in order to design more effective systems to improve consumers' overall experience with online health information searching (Toms & Latter, 2007; Zhang, 2013).

Understanding how system design can affect consumers' satisfaction and loyalty as well as applying this knowledge to designing an appropriate online system for a better online service is critical issues to be taken into consideration. Trust or rejection of health-related websites is based on design factors (Harris, Sillence, & Briggs, 2009). A well-designed website might have effect on positive attitudes, trust, satisfaction, and perceived risk (Vila & Kuster, 2011).

2.5.2 Content Sought

The main types of information sought online are general health information, weight control (Geana et al., 2012), diet, physical activity (Bianco et al., 2013), symptoms and causes of diseases as well as treatments and drugs (Jadhav et al., 2014). About half of the respondents in a study conducted by Weaver et al. (2010), spent their time during a typical week obtained either illness, wellness, or both types of health information online. Information on how to manage chronic disease, how to stay healthy, and clinical pathways when facing sickness (Dart & Gallois, 2010), vaccines, screening programs, smoking cessation (Bianco et al., 2013), and side effects of medication (Van de Belt et al., 2013) was among the most important types of health information searched.

Different groups of people have different demands when searching for health-related information on the Internet (Dart & Gallois, 2010). For instance, Korean users

shopped for health commodities and looked for the selection of hospitals besides seeking for general health tips and disease information online (Sug et al., 2010), whereas, about one-third of the Dutch population searched for ratings of health care providers online (Van de Belt et al., 2013).

The abilities to use the Internet in effective ways could be fostered by recommending websites with high-quality contents to consumers (Hardiker & Grant, 2011). Online health consumers prefer websites operated by government agencies, non-profit organizations, and universities as it were perceived as useful and unbiased sources (Hardiker & Grant, 2011; Kim et al., 2011). Furthermore, contents of online health information should be well organized, concise, comprehensible, and easy-to-find (Hardiker & Grant, 2011). Besides, aesthetical aspects should be emphasized as website quality is mostly judged by it (Kim et al., 2011).

2.5.3 Characteristics of Online Health Information Resource

People who often went online for health information and have high expectations of the value and quality of health information websites, especially in terms of reliability and relevance of content, were those who are more likely to perceive the Internet as playing an important role in life decisions or rate the Internet as more embedded in their lives (Leung, 2008). The previous perceptions or past experiences shape people's judgment of information available online (Peng & Logan, 2005; Saad et al., 2013). The abilities to use the Internet as an effective tool could be fostered by recommending quality websites to health consumers (Hardiker & Grant, 2011).

In a study of factors affecting the public participation with eHealth among English-speaking Canadians, more than 79% of respondents visited science-oriented

websites, including government websites, chronic illness online groups and foundation websites (Khechine, Pascot, & Prémont, 2008) in order to get trustworthy information on treatment options (Hardiker & Grant, 2011). Online health consumers prefer websites operated by government agencies, non-profit organizations, and universities as it was perceived as useful and unbiased sources (Hardiker & Grant, 2011; Kim, Park, & Bozeman, 2011). Furthermore, contents of health information should be well organized, concise, comprehensible, and easy-to-find even when the searches were misspelled (Hardiker & Grant, 2011). Besides, aesthetical aspects should be emphasized as website quality is mostly judged by it (Kim et al., 2011).

Users of health-related websites expect to find high quality information, which is not only easily accessible, but also using a medium that is interactive in nature. Accessibility of a website is evaluated by its navigation structures, user-friendliness, availability of specific information for the target group, and presented in acceptable formats (Gilmour, 2007). Users have high expectations for accessibility of the resource when searching for health-related information (Cudmore et al., 2011). Commercial websites were always considered superior than hospital websites in terms of design, quality, ease of use and usefulness (Cudmore et al., 2011).

Selection of sources while seeking for online health information is based on the perception of source accessibility (Marton & Choo, 2012). Accessibility can be defined as the ability to obtain, used, or experienced without difficulty and is barrier-free to all users. Users have high expectations for accessibility of the resources when searching for health-related information (Cudmore et al., 2011). Hence, accessibility can be viewed as how information seekers perceived the ease to reach an information source to acquire information. With technical obstacles to access online health information being increasingly diminished (Kim et al., 2012), online health consumers desire easily

accessible information (Cudmore et al., 2011) no matter what assistive technology they may use (i.e. computer or mobile device) (Goldberg et al., 2011).

Characteristics of accessibility such as easy to search, use, and read are important for health seekers with low reading skills (McInnes & Haglund, 2011). Additionally, language and culture may play role in online health information access (Bell, 2014; Eysenbach & Diepgen, 1999). Therefore, accessibility can be improve through designing efficient navigation scheme, increase user friendliness, personalized contents presented in formats acceptable to the user (Gilmour, 2007).

Users' perceived credibility of the websites as the main determinant in shaping the attitude towards the websites and willingness to rely on online health information (Park et al., 2009). It was also identified that consumers' perceived credibility of the information in the websites was the main determinant in forming of attitude towards disease information on the Internet (Yun & Park, 2010). This is due to perception that information seeking on the Internet is not for entertainment but due to certain purposes (e.g. to fulfill knowledge gap). The previous positive experience with the Internet is likely to affect perceived credibility of the medium (Gray et al., 2005). Content based credibility is considered to consist of the written components of a web site as well as how the site functions.

Credibility consists of two dimensions; trustworthiness (i.e. believable, bias, fair, objective, sensational, and truthful) and expertise (i.e., competent author, completeness, and accuracy of the contents) (Hovland, Janis, & Kelley, 1953; Metzger, Flanagin, & Zwarun, 2003). When identifying credibility of sources, users will look for authoritative characteristic like government-based sites or the presence of expert like doctors (Toms & Latter, 2007). Given the unregulated information on the Internet, one of the solution for health providers is to screen existing websites for credibility and

make specific recommendations to their patients. By getting information from these qualified resources, patients may understand more about their illness and prognosis, thus enhancing doctor and patient interactions (Lee & Hawkins, 2010).

In this section, challenges in using the Internet for health information, types of content sought by users, and also the characteristics of the online health information resources were put forward. Previous research has attempted to provide better solutions in searching for online health information through designing better query for health information retrieval (Soualmia, Prieur-Gaston, Moalla, Lecroq, & Darmoni, 2012; Zeng et al., 2006), recommender system (Wiesner & Pfeifer, 2014), and tool to assess and filter online health information (Eysenbach & Thomson, 2007). However, these approaches tended to focus on query processing and guidelines for online health information searching. Based on the findings from previous research work, this study will attempt to identify the characteristics of the online health information resources that contributes to online health information use. There are various types of content sought by online health information users with general health information and diseases among the most important information searched. Therefore, the prototype that will be developed in this study will be focusing on general health information, symptoms, diagnosis and tests, prevention and control, and also treatments and therapies.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodological approach to finding answers to research questions defined in this study. According to Nunamaker (1990), methodology is the philosophy of the research process "which includes the assumptions and values that serve as a rationale for research and the standards or criteria the researcher uses for interpreting data and reaching a conclusion". Research process is the application of scientific method to discover answers or solutions to questions and problems defined by the research. Research process in social and behavioral sciences involves a sequence of activities: 1) choosing the research problem(s), 2) stating hypotheses, 3) formulating the research design, 4) gathering data, 5) analyzing data, and 6) interpreting the results to test the hypotheses (Nunamaker et al., 1990).

This study adapted a multi-methodological approach to information system (IS) research by Nunamaker et al. (1990). The multi-methodological approach to IS research (see Figure 3.1) consists of four research strategies; theory building (e.g., conceptual frameworks, mathematical models), observation (e.g., case studies, survey studies), systems development (e.g., prototyping, demonstrator's development) and experimentation (e.g., computer simulations, laboratory experiments).

This study was carried out in several phases. The initial phase involves theory building by developing theoretical framework and research model based on previous studies. The main research steps were the collection of data based on sequential exploratory mixed methods research design. Structured interviews were used to refine the proposed research model. Survey methods were used to validate the research model. Next, the system development phase which consisted of the design and development of

a prototype with a set of characteristics and functionality. Finally, the observation's phase in which the prototype was tested with the evaluation collected from the participants. Further detail of the research process for each phase is presented in the upcoming sections.

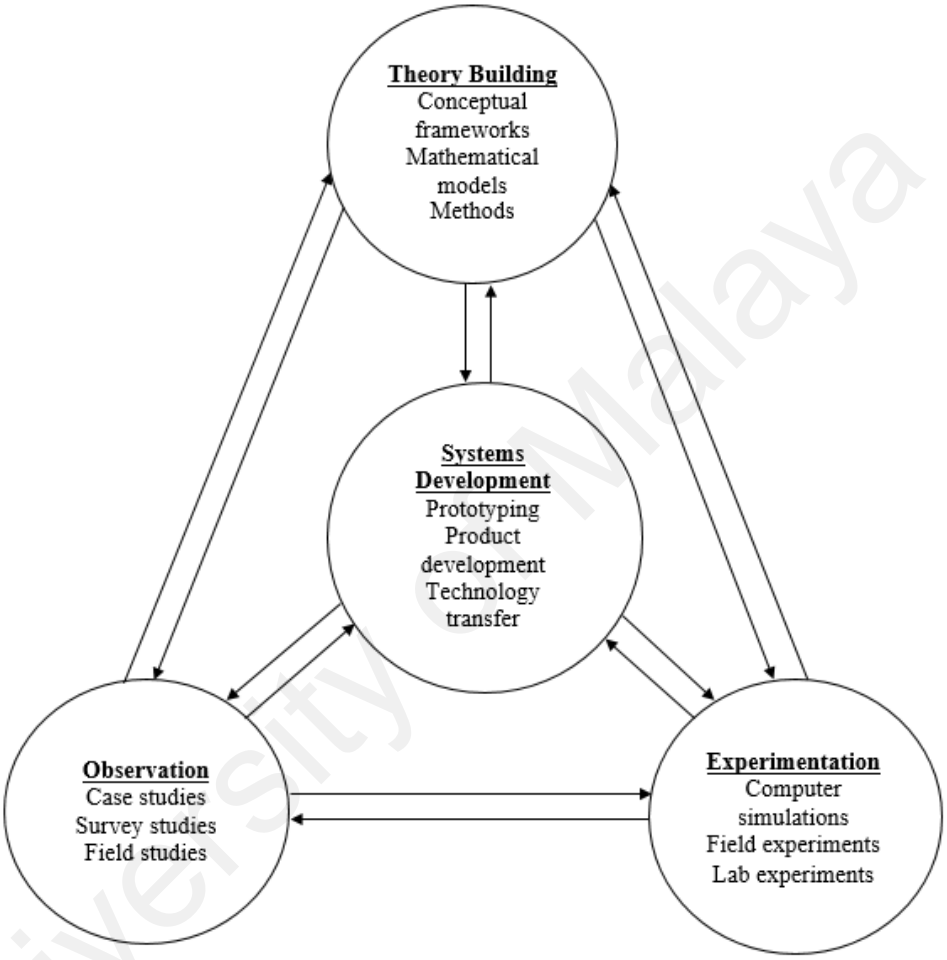


Figure 3.1: A multi-methodological approach to information system (IS) research (Nunamaker et al., 1990)

3.2 Theoretical Framework

Research model developed in this study, Online Health Information Use Model (OHIUM) consist of factors derives from various theories and past studies. The factors integrate personal factors and online health information characteristics due to the assumption that consumers' use of online health information resulted from both users

and technological perspectives. This view was argued in Affordance Theory (Gibson, 1979). The theory may assist researchers to investigate how online health information consumers use online health information sources in relation to their individualized needs, rather than focusing solely on the users or features of the sources being used. It may offer a framework for investigating why users would turn to this particular medium to obtain this type of information. This approach can provide an understanding of online health information behaviors and utilize this understanding in the design stage. Affordances is conceptualized in this study as the potential uses of online health information resulting from human factors and the features of online health information.

3.3 Research Model

Sequential exploratory mixed method was employed to define the research model proposed in this study. In the first phase, qualitative method consisted of individual interviews was carried out. Pilot interviews was conducted with three participants to identify the level of understanding and problems with the questions. Purposive sampling were used to select the participants with the following criteria: Malaysian women, residing in urban areas, aged 18 years and above. Structured interview was chosen as the method to collect data at this phase.

The strengths of a structured interview are that it is efficient with regards to time, limits researcher subjectivity and bias, and the researcher controls the topics and format of the interview, making it easier to code, compare and analyze data (Holloway & Wheeler 2010). At the beginning of the interview session, the identity of the researcher and the purpose of the interview was explained and interviewees was reassured that no attribution would be given to their views in any subsequent discussion or reports. Notes was taken during the interview and transcribed to assess the outcome

of the interview to know if saturation was achieved, inferring that addition of more participants did not add anything to the analysis of the data sets.

A total of 20 participants took part in the interview within the period of 6 weeks. Participants with age between 18 to 29 years consists of 11 individuals and another nine respondents with age between 30-49 years was involved. Thematic content analysis was adopted to analyze the qualitative data. Thematic content analysis involves analyzing transcripts, identifying themes, and grouping together examples of those themes from the text (Burnard, Gill, Stewart, Treasure, & Chadwick, 2008; Vaismoradi, Jones, Turunen, & Snelgrove, 2016).

Table 3.1: Thematic coding of qualitative data

Questions	Themes	Interview Transcripts
Do you use source(s) from the Internet to find health information?	• Convenient	• *"Yes, it is more convenient and fast"* • *"It's convenient"*
	• Fast	• *"Yes, because it is the fastest way to know about disease"* • *"Yes, I think it is the best and fastest way to find health information"* • *"Yes, because Internet are the fast source of information, everything is available"* • *"Easier and faster to get health information"* • *"I can get more information, easy and faster"* • *"It's easy, fast, a lot of variety on people's opinion and recommendations"* • *Yes, fast answers, can find the remedy quickly"*
	• Easy	• *"Yes, because it is so much easier and I am able to find anything at the end of my fingertips"* • *"Yes, because it's easy*

Questions	Themes	Interview Transcripts
		and detailed" • *"Yes, it's easy to find information"* • *"Yes, because it is easy to obtain the information"*
	• Access at anytime and anywhere	• *"I can find the answer to my questions every time and everywhere"*
	• Variety of resources	• *"Yes, because Internet is just a finger away to get any useful info. Sometimes, to make sure the info is correct, I'll read article in another health website to get confirmation"*
Do you experience any problem when searching for online health information?	• Untrustworthy	• *"Yes. There are so much untrustworthy websites"*
	• Fake	• *"Unsure of their status, whether it's a true or fake websites"*
	• Misleading information	• *"Misleading information"*
	• Unclear explanation	• *"Sometimes the explanation of the disease is not so clear"*
	• Not accurate	• *"Yes, sometimes the fact from one website is different from the other website"* • *"Sometimes I can't get accurate information or solution referring to my health condition"*
	• Information overload • Credibility	• *"Too many information and do not know the credibility status of the websites"*
	• Reliability	• *"Non-reliable, can't be 100% trusted"* • *"Google usually shows the worst possible outcomes when we google the symptoms"* • *"Yes, the reliability of the information on the Internet"* • *"To me, it's not trustable"*

Questions	Themes	Interview Transcripts
	• Accessibility	• *"Some websites would take time to load the information"* • *"Sometimes I get confused as different website gives different information"*
	• Too technical	• *"Some medical terminologies are too technical, need more time to find out the details"*
What would you suggest to improve the current features of online health information?	• Trustworthiness	• *"Only allow trustworthy articles that has been recognized by WHO or MOH to be published on Internet"*
	• Holistic websites	• *"Have a health website with complete info-symptoms, precautions, medications that should be taken, pictures on how the disease is, how does the disease contagious, probability people who will get the disease, awareness"*
	• Credibility	• *"Enforce a body to supervise the content posted online"* • *"Allow only qualified health officers to convey health information to avoid false information"* • *"Online health information should be proven and it can provide a specific online consultation for a member"* • *"Have professionals provide the information"* • *"Written by doctors"* • *"Add some references to ensure the credibility of the websites"* • *"Someone should check its credibility"*
	• User-friendliness	• *"Make the source more*

Questions	Themes	Interview Transcripts
	• Latest information	*user friendly and always up-to-date"*
	• Provide details	• *"Build a website that can tell detail for one disease and the additional information for related disease"*
	• Presented in simple ways	• *"Make it simple, for example just put the main idea or information and just put some elaboration"* • *"Don't exaggerate in elaborating disease"* • *"Use understandable language to make it easier to understand"* • *"Avoid using high medical term that others can't understand"*
	• Accessibility	• *"I hope online health information is more accessible"*
	• Variety of sources	• *"I prefer if they got voice or video or more pictures"*

Participants reported that their general health information sources included written materials such as books, newspapers, and health pamphlets. Besides doctors, participants were also depending on family members and friends for health information. According to one of the participants, *"I always search about health information from the Internet and also refer to the book."* Participants who search for health information on the Internet stated they started their search using Google with "*no preferred websites, just any search that I found."* Some preferred specific health websites such as Wikipedia, www.webmd.com, www.medlineplus.gov, and www.nih.gov.

The participants were asked if they used the Internet to find health information and their reason to do so. The general themes derived from the answers were the convenience, fast, and easiness aspect of getting the information from online sources.

The participants were asked if they encountered any problem when searching for online health information. Credibility, trustworthiness, reliability and the issues with content were the main concerns raised by the respondents.

A number of hypothetical questions were asked to understand the willingness to use online health information resource with certain criteria. The hypothetical questions are “Would you use an online health information resource that allows you to access health information with ease (i.e. showing information from multiple trustworthy websites so you can easily compare health information from various sources)," “Provides highly informative content by categories (i.e. General Information, Symptoms, Diagnosis and Tests, Prevention and Control, Treatments and Therapies)," “Provides latest information on current health concerns such as disease outbreaks that can help in prevention and precaution," “Allows you to save the information for future reference and/or share it with others through social media/email”. Based on the responses provided, the majority of respondents are willing to and interested to use online health resource with such features. Among suggestions provided by respondents to improve the current features of online health information are to ensure the credibility of the information, ease of access, and quality of the content.

According to respondents, factors that were most likely to contribute to their online health information activity are concerns about their health conditions and others, they want to manage their health, for social support, and they felt satisfied with information available online. The findings from this data collection phase lead to research model development. This study was grounded upon the assumption that consumers’ use of online health information must be considered from both users and to gain technological perspectives. Based on Affordance Theory, online health information use should be considered from both users and technological aspects. The factors were grouped into themes to gain a greater understanding of online health information use

based on personal factors and online health information characteristics. By integrating personal factors and online health information characteristics, the researcher proposed an enhanced research model, OHIUM to gain a greater understanding of the factors that contribute to online health information use (see Figure 3.2). The operational definition of each constructs is given in Table 3.2.

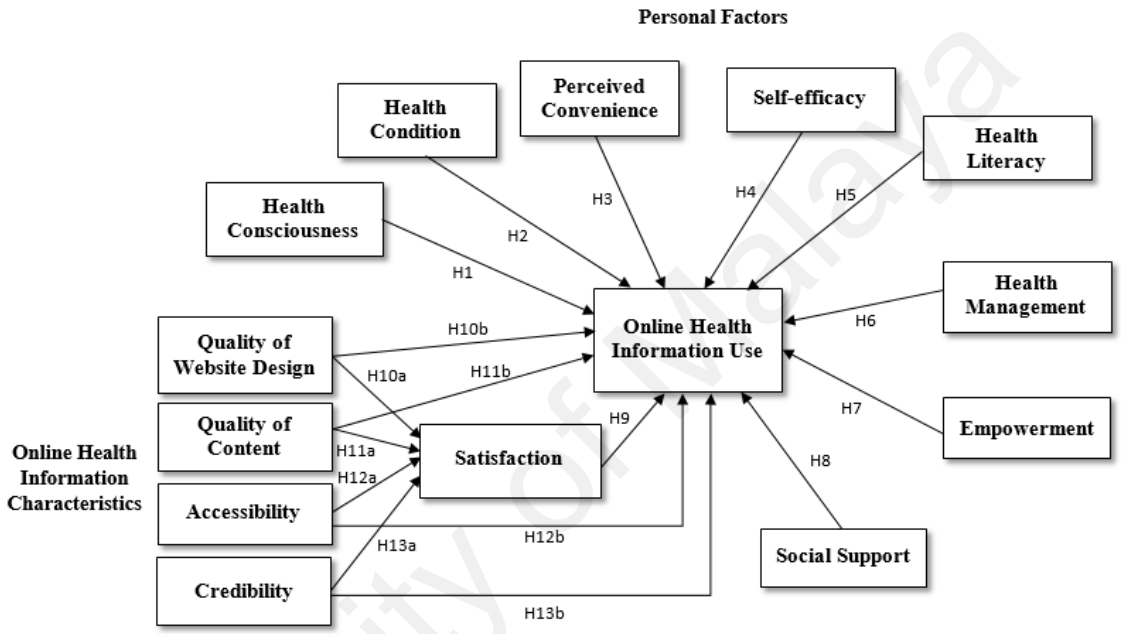


Figure 3.2: Online Health Information Use Model (OHIUM)

Table 3.2: Operational definition of constructs

Constructs	Operational Definition	Source
Health Consciousness	An attitude in which one has an interest in one's health.	(Iversen & Kraft, 2006; Michaelidou & Hassan, 2008)
Health Condition	The state of health of a person.	(Fox & Purcell, 2010)
Perceived Convenience	Level of convenience toward time, place and execution that one feels when involve with activity.	(Chang et al., 2012; Yoon & Kim, 2007)
Self-efficacy	Individuals' beliefs in their capability to exercise control over challenging demands and their own effectiveness.	Social Cognitive Theory (Bandura, 1995)
Health Literacy	The degree to which individuals have the capacity to obtain, process, and understand basic health information and	(Jensen et al., 2010; Ratzan & Parker, 2000; Sørensen &

Constructs	Operational Definition	Source
	services needed to make appropriate health decisions.	Broucke, 2012)
Health Management	Taking control of health through active participations.	Theory of Planned Behavior (Ajzen, 1991)
Empowerment	Willingness to become more involved by having knowledge to make health care decisions.	(Schulz & Nakamoto, 2013)
Social Support	The supportive assistance available from others in term of emotional, companionship, or informational in the form of advice, guidance or other useful information.	(Heaney & Israel, 2008; Langford et al., 1997; Slevin et al., 1996; Wills, 1991)
Satisfaction	The pleasure or contentment obtained from fulfillment or gratification of need.	Uses and Gratification Theory (Katz et al., 1974)
Quality of Website Design	Features available on the website that meet users need.	(Vila & Kuster, 2011)
Quality of Content	Well organized contents, thorough, valid and have a strong level of evidence.	(Hardiker & Grant, 2011)
Accessibility	Ability to obtained, used, or experienced without difficulty and is barrier-free to all users.	(Goldberg et al., 2011)
Credibility	Trustworthiness in term of expertise, completeness, and accuracy of information sources.	(Yun & Park, 2010)
Online Health Information Use	The actions of searching for online health information determined by personal factors and online health information characteristics	Affordance Theory (Gibson, 1979)

Based on the proposed research model, OHIUM, the hypotheses for direct effects are as follows.

H1: Health consciousness is positively associated with online health information use by urbanized Malaysian women.

H2: Health condition is positively associated with online health information use by urbanized Malaysian women.

H3: Perceived convenience is positively associated with online health information use by urbanized Malaysian women.

H4: Self-efficacy is positively associated with online health information use by urbanized Malaysian women.

H5: Health literacy is positively associated with online health information use by urbanized Malaysian women.

H6: Health management is positively associated with online health information use by urbanized Malaysian women.

H7: Empowerment is positively associated with online health information use by urbanized Malaysian women.

H8: Social support is positively associated with online health information use by urbanized Malaysian women.

H9: Satisfaction is positively associated with online health information use by urbanized Malaysian women.

H10a: Quality of website design is positively associated with satisfaction.

H10b: Quality of website design is positively associated with online health information use by urbanized Malaysian women.

H11a: Quality of contents is positively associated with satisfaction.

H11b: Quality of contents is positively associated with online health information use by urbanized Malaysian women.

H12a: Accessibility is positively associated with satisfaction.

H12b: Accessibility is positively associated with online health information use by urbanized Malaysian women.

H13a: Credibility is positively associated with satisfaction.

H13b: Credibility is positively associated with online health information use by urbanized Malaysian women.

Mediating factor was included into the research model with the assumptions that antecedent variables affect a mediating variable, which then affects a dependent variable. Mediation analysis can explain how one variable affects another (Henseler et al., 2016; MacKinnon et al., 2007). For instance, previous study found that access to social support resources mediated the effect of Internet health information seeking on three health outcomes (general, emotional, and physical) (Jiang & Street, 2016). In another study, perceived ease of use, perceived usefulness, and perceived credibility mediated the effect of subjective health knowledge and Internet efficacy on users' attitude and intention to use online health information (Kim et al, 2012).

Inclusion of satisfaction that plays an intermediate role in the relationship between online health information characteristics and online health information use can explain how the mediating factor improve or hinder the influence of independent variables on dependent variable (Castro & Roldán, 2013; Nitzl, Roldán & Cepeda, 2016). Based on UGT model, satisfaction in media predicted the use of the Internet as a source for health information. Obtained gratifications may differ from those sought, and the resulting gap can predict the level of satisfaction/dissatisfaction that individuals experience from the usage of a particular media. OHIUM placed satisfaction as a mediator (i.e., factors that influence the relationship) between online health information characteristics and online health information use.

Results of mediation analysis will show the total effects of the causal relationship between online health information characteristics and online health information use, and mediated effects in which online health information characteristics exerted an indirect effect through satisfaction on online health information use. In other words, the better quality of website design, quality of contents, accessibility, and credibility leads to more satisfactions, which in turns predicts online health information use. Thus, the hypotheses for indirect effects are as follows.

H14: Satisfaction mediates the relationship between quality of website design and online health information use by urbanized Malaysian women.

H15: Satisfaction mediates the relationship between quality of contents and online health information use by urbanized Malaysian women.

H16: Satisfaction mediates the relationship between accessibility and online health information use by urbanized Malaysian women.

H17: Satisfaction mediates the relationship between credibility and online health information use by urbanized Malaysian women.

3.4 Survey Method

This section describes the method employed in gathering answers to research questions and testing the hypotheses of the model. A cross-sectional design was adopted to validate the proposed research model and hypotheses. The survey method was selected with questionnaires as an instrument of data gathering. This method can be administered efficiently for data collection in a large sample size (Hair, Bush, & Ortinau, 2006). Furthermore, it is suitable in collecting data about attitudes and motivation as well as

respondents' perceptions on the topic of interest (Burns & Bush, 2000; Shaughnessey, Zechmeister, & Zechmeister, 2012). The structure of the method is shown in Figure 3.3. The section begins with the explanation of the instrument development process. Following this section, description on sampling method is presented. The third section details out the data collection procedure in this study and the last section describes the data analysis method.

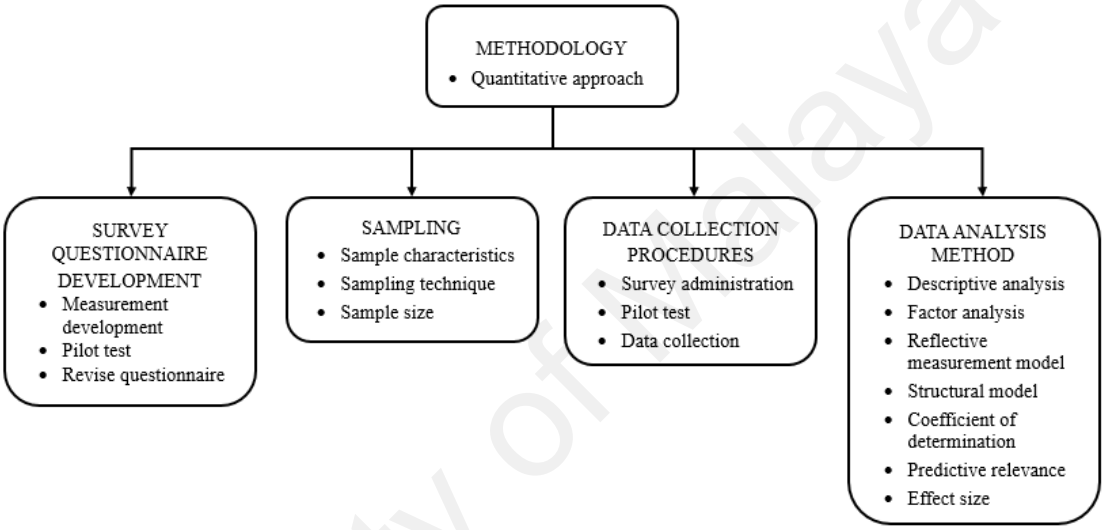


Figure 3.3: Structure of survey method

3.4.1 Survey Questionnaire Development

The development of research instruments begins with identifying relevant constructs in the previous literature. The conceptual definition of constructs was developed based on theoretical background and past studies. The measurement items used in this study were based on the extensive review of literature. The proven validity and reliability of measurement items are one of the advantages of developing instruments based on the existing validated measurements. Furthermore, the researcher are able to discuss the findings within the corpus of knowledge in the field of study.

The survey questionnaire consists of two parts; demographic and measurement of constructs. The demographic section comprises of questions about age, race, location, income, level of education, and questions on online health information behaviors such as frequency, duration, purpose of search, topic, visited sites and preferred sources for health information with 10 questions. The latter part comprises of three sections with 57 questions. The first section consists of items related to personal factors with 25 questions. The second section consists of questions about online health information features with 23 questions, and the final section related to satisfaction and dependent variable measurements with 9 questions (see Appendix A). All the measures in the second part were quantified using 5-point Likert scale ranging from one for "strongly disagree" to five representing "strongly agree" and a middle neutral point.

The validity and reliability of measurement instruments were tested through a pilot test. Following suggestion made by Sapnas and Zeller (2002), 55 respondents were involved in this pilot study to allow the running of proper statistical testing procedures. The test was conducted with online survey. The respondents selected for pilot study were chosen to closely represent the sample of study, in particular, Malaysian women in urban areas, aged 18 years and above. Problems with the contents, level of understanding, style, and design of the instruments were identified at this stage. Based on the feedbacks made by respondents during the pilot test, several weaknesses of the questionnaire were identified. For instance, the respondents suggested that instructions should be provided in each section of the questionnaire. It was also suggested that some of the questions need to be simplified, and the rearrangement of the layout would make the questionnaire easier to read. The questionnaire was modified and refined based on the suggestions before the actual data collection was carried out. Exploratory Factor Analysis (EFA) was carried out using the pilot data. The purpose of EFA is to identify the possible associations between items to formed distinct factors (Schmitt, 2011). The

principal component analysis (PCA) with orthogonal rotation (varimax) was conducted for both independent variables and dependent variable. The reliability of the measures was determined by Cronbach's alpha. The researcher applied cut-off value of 0.6, which is at the minimum acceptable level of reliability for preliminary research (Kline, 2000; George & Mallery, 2003) and is considered as acceptable internal consistency (Bowling, 2014). The factors, research model, and hypotheses were refined based on the EFA results. The number of questions was reduced to 51 questions from 57 questions after EFA. The result of pilot study is presented in Section 4.3. Responses from pilot study were not used in the final analysis due to the changes made to the questions after EFA.

3.4.2 Sampling

In this study, the domain of interest is the general population of Malaysian women in urban areas, aged 18 years and above. Urban area is characterized by the density of population, economic function, or the presence of urban characteristics such as paved streets, electric lighting, and sewerage (Vlahov & Galea, 2002). Definition of urban area in Malaysia by the Department of Statistics refers to gazetted areas with their adjoining built-up areas and combination of both areas have a total population of 10,000 or more (Population and Housing Census, 2016). A number of reasons justify the selection of the research setting. Disparity existed between the urban and rural areas in terms of Internet penetration. The urban area was chosen as the Internet diffusion in this area is higher compared to rural area.

Discrepancy in the access to the Internet may have significant implications in terms of benefits that could be gained from online health information sources (Gibbons et al., 2011). Any health applications are of little use if people do not have the right

technology to actively engage with it. In this case, it is the urban areas which benefit the most in terms of ability to access and use online health information. Therefore, the research conducted in the selected scope will be beneficial for the group of people who will be affected the most.

Purposive sampling was adopted in this study as the researcher wanted to highlight a specific subgroup within the population. The sample was selected based on a number of criteria; Malaysian women in urban areas, aged 18 years and above, and also, as the target sample was women in urban areas who use the Internet by involving in online activities like email, the researcher referred to the directory of public and private institutions for email addresses. For instance, email addresses were obtained from public and private universities and also government and non-government agency's websites. The sample size is determined based on Krejcie and Morgan (1970) and Sekaran (2006). The formula to determine the sample size is:

$$n = \frac{X^{2*}N^{*}P^{*}\ (1\text{-}P)}{(ME^{2*}(N\text{-}1))+(X^{2*}P^{*}(1\text{-}P))} \qquad (1)$$

Where:

n: required sample size

x^2: Chi-square for the desired confidence level at 1 degree of freedom

N: population size

P: Population proportion

ME: desired margin of error (expressed as a proportion)

According to Malaysian Communications and Multimedia Commission, the population size of female in urban areas with Internet access in 2012 is 9.4 million (32.6%). Based on the formula, a total of 384 samples of women was needed for the

population size sample in this study. The clearly defined target population that fits the research goals can limit sampling bias.

3.4.3 Data Collection Procedures

The method adopted is the self-administered survey method which was distributed among the target sample of the research. The survey consists of questions enquiring about demographics, online health information activities, and factors involving online health information use. The survey was piloted in December 2012. The item was refined and finalized based on the feedback and analysis of the pilot survey. Subsequently, an actual data collection was conducted from February to April, 2013. A total of 2,200 invitations to participate in the survey was emailed and 462 questionnaires was answered resulting in a response rate of 21%.

The survey included a brief introduction and purpose of the study. Respondents were informed that the survey consisted of questions to better understand online health information use. The confidential nature of participation as well as measures taken in protecting any sensitive information was ensured. Instruction to answer the questions is specified in each section. The survey was available in English and the local Malay language. Participants were informed that proceeding to engage with the survey demonstrated their consent to participate. It was estimated that each respondent would require about 20 minutes to complete the questionnaire.

3.4.4 Data Analysis Method

Statistical analysis of respondents profile was analyzed using Statistical Product and Service Solutions software (SPSS) version 20. Descriptive analysis was performed to understand the socio-demographic of respondents. The analysis of respondents profile is presented in Section 4.2. The research model was analyzed with SmartPLS version 2.0 M3 (Ringle, Wende, & Will, 2005) using the Partial Least Squares (PLS) approach. PLS is a second generation multivariate technique (Fornell & Cha, 1994) which can simultaneously evaluate the measurement model (the relationships between constructs and their corresponding indicators), and the structural model with the aim of minimizing the error variance (Chin, 1998). Out of 462 returned questionnaires, the researcher analyzed 396 completed responses from the second part of the questionnaire for this analysis. Incomplete answers and response with a straight lining pattern (Hair, Hult, Ringle, & Sarstedt, 2013) was excluded. The researcher used the bootstrapping method (5000 resamples, 400 cases) to determine the significance levels for loadings, weights, and path coefficients (Hair, Ringle, & Sarstedt, 2011).

Following the two-step approach (Chin, 2010), the researcher first examined the measurement model for internal consistency reliability, convergent validity, discriminant validity (Hair et al., 2011). The internal consistency reliability test was confirmed by the presence of items loading on its respective factors. Convergent validity was used to confirm the degree to which different items that attempt to measure the same construct agree and should be highly correlated (Bagozzi & Phillips, 1982). Convergent validity was assessed through factor loading, Composite Reliability (CR), and Average Variance Extracted (AVE). Discriminant validity is the degree to which constructs are unrelated to each other. The measure used in the assessment is Fornell-Larcker criterion (Fornell & Larcker, 1981), in which the researcher compare the square

root of the AVE with correlations. The recommended value for CR should be > 0.7 and AVE > 0.5 (Hair et al., 2011).

In this study, the researcher performed both EFA and Confirmatory Factor Analysis (CFA) to check the validity of the measurement model. The defined factors in EFA is further analyzed with CFA. Then, the structural model to test the research hypotheses was examined. The assessment involves the relationships of constructs in the proposed research model. Additionally, the researcher determine the coefficient of determination (R^2) and predictive relevance (Q^2) of the model as well as the effect size (f^2 and q^2) of the model (Hair, Hult, et al., 2013). The coefficient of determination (R^2) is a measure of the proportion of the variance in the dependent variable that is predictable from the independent variable.

3.5 Research Prototype

The final stage of the methodological approach was carried out to answer the third research question. In this stage, a specific methodology in developing an information system was adopted to guide the development process. A system development methodology refers to the framework that is used to structure, plan, and control the process of developing an information system. A linear-sequential life cycle model or waterfall model was employed to develop the online health information resource prototype. This model was selected as the requirements of the prototype are well-known and clearly defined (Patel & Jain, 2013).

Waterfall model consists of five phases: (1) requirement gathering and analysis; (2) system design; (3) implementation; (4) testing; and (5) maintenance (Avison & Fitzgerald, 2003). In this model, each phase must be completed before implementing the

next one. Information gathered from survey method was used to design and develop a working prototype. Testing only begins after the development is completed. The rule of 16±4 (i.e. 12 to 20 users is valid for user testing) was referred to in determining the number of responses for prototype testing (Alroobaea & Mayhew, 2014). Participants were recruited using similar sample for survey questionnaire. The researcher targeted Malaysian women in urban areas, aged 18 years and above as participants for the testing phase. The evaluation item were based on the questions asked in the survey method. The purpose is to further validate the factors found in the research model. Descriptive analysis using SPSS was performed on the data collected for prototype testing.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter explains the analysis of research questions and objectives of this study. The first research question is to find possible factors for the enhanced research model that predicts online health information use by urbanized Malaysian women. Sequential exploratory mixed method was adopted as data collection approach to identify the factors. Qualitative data was collected through structured interviews for this purpose. The outcome of this phase is the research model proposed in this study and it was validated through quantitative data collections. EFA was performed using data from a pilot study to identify the distinctive factors and reliability of the measurement items. CFA using data collected from the survey is a further assessment of measurement models to analyze internal consistency reliability, convergent validity, and discriminant validity of the factors.

The second research question is to determine the factors associated with online health information use as shown in the research model, OHIUM. An evaluation of the structural model was performed to test the research hypotheses in which significant relationship between the factors and online health information use was identified. Thus, factors predicting the online health information use by urbanized Malaysian women was identified in this section. Additionally, the predictive power of OHIUM was presented in this chapter.

4.2 Profile of Respondents

A demographic profile of respondents is presented in Table 4.1. The highest group of users are adults within 30 to 49 years old (52.6%). Another study reported that people among the ages 30–39 frequently searched for online health information (AlGhamdi & Moussa, 2012). A total of 81.3% have more than five years of experience in using the Internet. When searching for online health information, users' most likely use general terms (54.9%) or use the type of questions that they would have asked their doctors (24.6%). The highest percentage of users searched for online health information few times a month with 31.4%. A total of 75.2% users reported that they visited 2 to 5 sites in each session. About half of the users (48.6%) spent less than an hour every time they search for online health information and another half (50.8%) spent in between 1 to 5 hours. The users commonly searched for information for themselves (42%) or their family (40.2%). The Internet is the much preferred source with 84% selected this medium followed by doctors or health professional advice with 72%. Users also rely mostly on family or friends (53%) and magazines (51.3%) as a source of health information. This is in line with research findings by Bell (2014), in which women with high socioeconomic status depends on variety sources besides the Internet, including books, friends, family, and physicians.

Table 4.1: Profile of respondents

Items	Descriptions	n	Percentage
Age	18-29	173	40.8%
	30-49	223	52.6%
	50-64	27	6.4%
	65 and above	1	0.2%
Highest level of education completed	College/University	394	89.95%
	Secondary School	43	9.82%
	Primary School	1	0.23%
Household income (per month)	1,000 and below	42	9.40%
	1,001–4,000	174	38.93%
	4,001 – 7,000	133	29.75%
	7,001 and above	98	21.92%
Internet experience	Less than 1 year	14	3.12%
	1-5 years	70	15.59%
	More than 5 years	365	81.29%
Searching technique	Using general terms	248	54.87%

Items	Descriptions	n	Percentage
	Using medical terms (e.g. diagnosis, drugs names)	82	18.14%
	Using queries (e.g. AND, OR, NOT)	11	2.43%
	Using questions I would have asked doctors (e.g. "What is the symptoms of the infection?")	111	24.56%
Health websites per visit	1 site	24	5.32%
	2-5 sites	339	75.17%
	6 sites and more	88	19.51%
Frequency of access	Few times a day	20	4.65%
	Few times a month	135	31.40%
	Few times a week	67	15.58%
	Once a day	23	5.35%
	Once a month	82	19.07%
	Once a week	103	23.95%
Duration per visit	Less than 1 hour	219	48.56%
	1-5 hours	229	50.78%
	More than 5 hours	3	0.67%
Usually search health related information for	Myself	392	41.97%
	Family	375	40.15%
	Friends	167	17.88%
Preferred sources	Doctors/Health Professionals	334	72.29%
	Internet	389	84.20%
	Television	137	29.65%
	Radio	51	11.04%
	Books	192	41.56%
	Magazines	237	51.30%
	Newspapers	169	36.58%
	Family/Friends	245	53.03%

The survey also consists of an optional open-ended question for respondents to provide their comments or suggestions on online health information. A total of 31 responses was collected from this section with some responses overlapped and reinforced each other. Responses provided are as follows:

- *"In term of accessibility, there should be no fee and registration required to access information besides making online international journals related to health more accessible"*
- *"Ensure reliability of the source, written by doctors or health professionals"*
- *"Some information (e.g. medical terms, symptoms) is not correct"*
- *"Regular updates, at least quarterly in a year"*
- *"Provide latest information or news"*

- *"Too much advertisements"*
- *"Easy access on general topic"*
- *"User-friendly. Improve the way content were organize on health websites as for some websites, new webs pages needed to be opened for further information"*

The responses were taken into consideration for prototype development, especially in terms of accessibility and reliability of the source as it reflects the real issues that online health information users encountered when using online health information resources. Further discussions of each characteristic were discussed in Chapter 5.

4.3 Exploratory Factor Analysis

EFA was performed to classify items on the questionnaire that formed the factors in OHIUM. The principal component analysis (PCA) with orthogonal rotation (varimax) was conducted for both exogenous and endogenous variables of the reflective measurement model. The reliability of the measures was determined by Cronbach's alpha. The researcher applied cut-off value of 0.6, which is at the minimum acceptable level of reliability for preliminary research (Kline, 2000; George & Mallery, 2003) and is considered as acceptable internal consistency (Bowling, 2014). Of 57 items in the questionnaire, 51 items are measuring exogenous variables, and another six items measuring endogenous variable. The first factor analysis was performed on the 51 items of the exogenous variables. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO=.92. Bartlett's test of sphericity, x^2 (1326) = 14802.22, p<.001, indicated that correlations between items were sufficiently large for PCA. Table 4.2 shows the items' loadings of the exogenous variables.

Table 4.2: EFA for exogenous variables

Factors	Factor loadings	Cronbach's α	Mean	SD
Quality of Website Design		**.93**	**3.25**	**4.86**
QW1	.658			
QW2	.786			
QW3	.899			
QW4	.804			
QW5	.758			
QW6	.841			
QW7	.771			
QW8	.697			
Quality of Content		**.93**	**3.58**	**3.65**
QC1	.733			
QC2	.794			
QC3	.786			
QC4	.821			
QC5	.821			
QC6	.753			
QC7	.753			
QC9	.627			
Credibility		**.88**	**3.41**	**2.22**
CR1	.813			
CR2	.638			
CR3	.816			
CR4	.849			
Empowerment		**.85**	**4.08**	**1.62**
EM1	.700			
EM2	.660			
EM3	.919			
EM4	.818			
Skill		**.85**	**3.73**	**3.03**
HL1	.676			
HL2	.696			
HL4	.734			
SE1	.761			
SE3	.818			
Social Support		**.89**	**3.36**	**2.39**
SS2	.821			
SS3	.868			
SS4	.869			
Health Concern		**.78**	**4.17**	**1.59**
HCN1	.734			
HCS2	.711			
HCS3	.707			
Perceived Convenience		**.94**	**3.97**	**1.26**
PC1	.842			
PC2	.810			
Health Management		**.69**	**3.67**	**3.84**
HM1	.686			
HM2	.685			
HM3	.612			
Satisfaction		**.84**	**3.95**	**1.38**
SA1	.686			
SA2	.770			
SA3	.684			
Accessibility		**.65**	**3.38**	**1.36**
AC1	.706			
AC2	.785			

QW: Quality of Website Design; QC: Quality of Content; CR: Credibility; EM: Empowerment; HL: Health Literacy; SE: Self-efficacy; SS: Social Support; HCN: Health Concern; HCS: Health Consciousness; PC: Perceived Convenience; HM: Health Management; SA: Satisfaction; AC: Accessibility; SD: Standard Deviation

In the initial model, 13 factors of exogenous variables with 51 items were identified. The factors were refined and reduced to 11 factors with 45 items after the factor analysis and accounted for 75.5% of the total variance explained. The first factor accounted for 22.4% of the variance and consists of eight items measuring the quality of website design. This factor had an alpha correlation of 0.93. Factor two also consists of eight items measuring the quality of content. This factor accounted for 13.2% of the variance and had an alpha correlation of 0.93. One item from this factor was removed as the loading value is not sufficient. The item removed is "Multiple modes of information in a single medium (e.g. text, picture, video, etc.)".

Factor three accounting for 7% of the variance with alpha correlation of 0.88, consists of four items measuring credibility. Factor four, empowerment, contained four items, accounted for 6.3% of the variance with alpha correlation of 0.85. The fifth factor consists of items initially measuring health literacy and self-efficacy. Items for each factor loaded significantly as a single factor, and it was therefore considered as one factor, skill. This factor accounted for 5.4% of the variance and had an alpha correlation of 0.85. One item each from health literacy and self-efficacy with low factor loadings was removed. Item removed from health literacy is "I feel that I am in control of what I learn about my health using the Internet" and another item for self-efficacy is "I am confident gathering information on the Internet".

Factor six accounting for 5.2% of the variance with alpha correlation of 0.89, contained three items measuring social support. An item with low factor loading was removed from this factor, that item is, "Get support, help and advice from other people with similar health conditions". Factor seven consists of items initially measuring health consciousness and health condition. Items for the factors emerged as one factor, and it was therefore considered as a single factor, health concern. This factor accounted for 3.7% of the variance and had an alpha correlation of 0.78. One item each from health

consciousness and health condition was removed due to low factor loadings value. The items were "I often feel guilty for not doing enough to improve my personal health" and "I often feel powerless when faced with health problem", respectively.

Factor eight, perceived convenience, contained two items accounting for 3.4% of the variance with alpha correlation of 0.94. Factor nine accounted for 3.3% of the variance with alpha correlation of 0.69, consists of three items measuring health management while factor 10 accounting for 3.1% of the variance with alpha correlation of 0.84, consists of three items measuring satisfaction. Factor 11 consists of two items measuring accessibility. This factor accounted for 2.6% of the variance and had an alpha correlation of 0.65.

The second factor analysis was performed on the six items for the endogenous variable, online health information use (Table 4.3). The results showed KMO=.77 and Bartlett's test of sphericity x^2 (15) = 170.08, p<.001. Five items loaded meaningfully on this factor and accounting for 58.2% of the variance with alpha correlation of 0.87. One item was removed due to low factor loading (i.e. less than 0.6). The item is "I have capability to do so". Based on the results of EFA, OHIUM was refined (see Figure 4.1).

Table 4.3: EFA for endogenous variables

Factors	Factor loadings	Cronbach's α	Mean	SD
Online Health Information Use		**.87**	**4.08**	**2.32**
DV1	.865			
DV2	.859			
DV3	.828			
DV4	.691			
DV5	.743			
SD: Standard Deviation; DV: Dependent Variable				

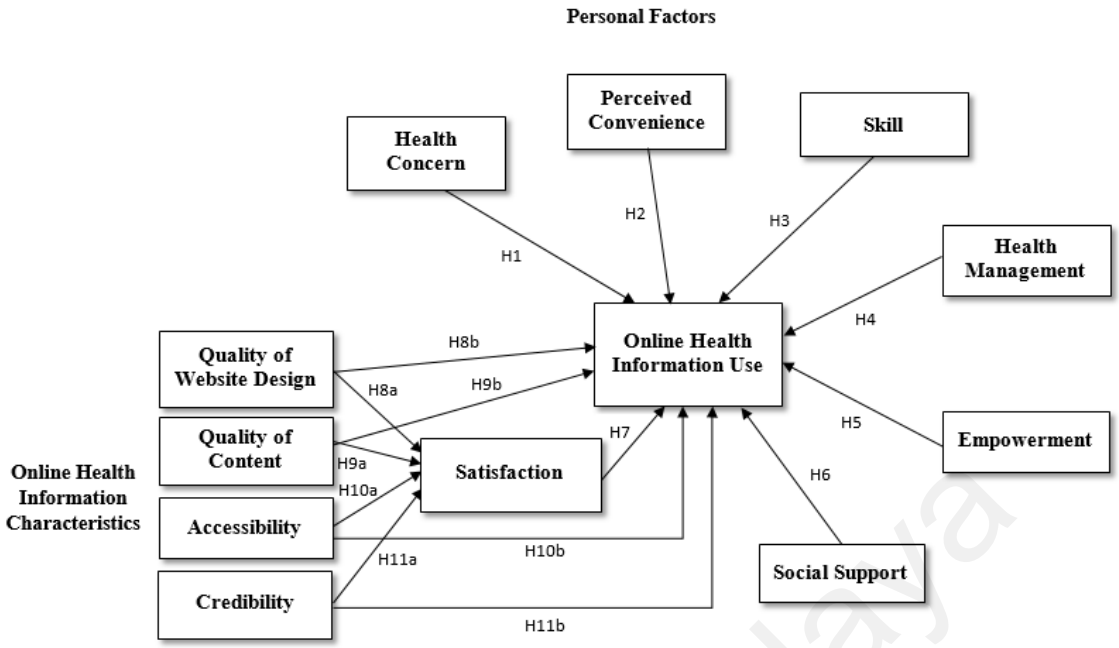


Figure 4.1: Revised OHIUM after EFA

Consequently, the hypotheses were adjusted based on the changes.

H1: Health concern is positively associated with online health information use by urbanized Malaysian women.

H2: Perceived convenience is positively associated with online health information use by urbanized Malaysian women.

H3: Skill is positively associated with online health information use by urbanized Malaysian women.

H4: Health management is positively associated with online health information use by urbanized Malaysian women.

H5: Empowerment is positively associated with online health information use by urbanized Malaysian women.

H6: Social support is positively associated with online health information use by urbanized Malaysian women.

H7: Satisfaction is positively associated with online health information use by urbanized Malaysian women.

H8a: Quality of website design is positively associated with satisfaction.

H8b: Quality of website design is positively associated with online health information use by urbanized Malaysian women.

H9a: Quality of content is positively associated with satisfaction.

H9b: Quality of content is positively associated with online health information use by urbanized Malaysian women.

H10a: Accessibility is positively associated with satisfaction.

H10b: Accessibility is positively associated with online health information use by urbanized Malaysian women.

H11a: Credibility is positively associated with satisfaction.

H11b: Credibility is positively associated with online health information use by urbanized Malaysian women.

H12: Satisfaction mediates the relationship between quality of website design and online health information use by urbanized Malaysian women.

H13: Satisfaction mediates the relationship between quality of content and online health information use by urbanized Malaysian women.

H14: Satisfaction mediates the relationship between accessibility and online health information use by urbanized Malaysian women.

H15: Satisfaction mediates the relationship between credibility and online health information use by urbanized Malaysian women.

In the EFA, the initial constructs and measurement items proposed in the study were tested and clearly defined. The OHIUM were revised based on the analysis before the evaluation of the model was performed. The upcoming sections will discuss the evaluation of OHIUM in detail.

4.4 Evaluation of Reflective Measurement Model

The assessment of reflective measurement models is the first step of PLS analysis involving the analysis of the internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2011). The internal consistency reliability test was confirmed by the presence of items loading on its respective factors as demonstrated on the cross loading table (see Appendix B). Consequently, the researcher examined the convergent validity. The results exceeded the recommended values as stated previously in the research method, thus indicating sufficient convergent validity (see Table 4.4).

Table 4.4: Convergent validity of measurement models

Model construct	Cronbach's α	CR [a]	AVE [b]
Accessibility	0.732	0.880	0.785
Credibility	0.895	0.927	0.760
Empowerment	0.913	0.939	0.794
Health Concern	0.711	0.838	0.636
Health Management	0.779	0.872	0.696
Online Health Information Use	0.900	0.923	0.667
Perceived Convenience	0.832	0.922	0.856
Quality of Content	0.948	0.956	0.732
Quality of Website Design	0.925	0.939	0.660

Model construct	Cronbach's α	CR [a]	AVE [b]
Satisfaction	0.883	0.928	0.810
Skill	0.842	0.886	0.611
Social Support	0.908	0.941	0.842

[a] Composite reliability (CR) = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (square of the summation of the error variances)}

[b] Average variance extracted (AVE) = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings) + (summation of the error variances)}

Discriminant validity is the degree to which constructs are unrelated to each other. The measure used in the assessment is Fornell-Larcker criterion (Fornell & Larcker, 1981), in which the researcher compare the square root of the AVE with correlations. Discriminant validity of the constructs is supported when the square root of the AVE is greater than all the inter-construct correlations (Chin, 1998). As the results show, all the square roots are greater than any other correlation, representing a required aspect of the discriminant validity of the variables. The factor loadings of all items support the use of selected items as indicators of the constructs they were initially designed to measure (see Table 4.5). Therefore, the results demonstrate the adequate discriminant validity.

Table 4.5: Discriminant validity of constructs

Constructs	1	2	3	4	5	6	7	8	9	10	11	12
1. Accessibility	**0.886**											
2. Credibility	0.535	**0.872**										
3. Empowerment	0.143	0.242	**0.891**									
4. Health Concern	0.154	0.202	0.484	**0.798**								
5. Health Management	0.152	0.226	0.629	0.465	**0.834**							
6. Online Health Information Use	0.332	0.408	0.511	0.473	0.421	**0.817**						
7. Perceived Convenience	0.263	0.226	0.412	0.549	0.348	0.508	**0.925**					
8. Quality of Content	0.536	0.683	0.317	0.278	0.289	0.419	0.323	**0.856**				
9. Quality of Website Design	0.572	0.666	0.244	0.186	0.267	0.323	0.236	0.673	**0.812**			
10. Satisfaction	0.401	0.434	0.386	0.343	0.338	0.788	0.399	0.418	0.370	**0.900**		
11. Skill	0.127	0.136	0.405	0.499	0.368	0.441	0.516	0.262	0.127	0.335	**0.782**	
12. Social Support	0.234	0.219	0.187	0.153	0.256	0.189	0.117	0.172	0.352	0.171	0.059	**0.918**

Diagonals (in bold) represent the square root of the AVE while the other entries represent the correlations

Additional assessment for measurement model is a common method bias. The common method bias issue is a concern while examining the reliability and validity of a research model. Unexpected biased-response errors can exist with self-reported data and may seriously affect the research findings (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). A Harman's single-factor test through EFA is an approach to confirm common method bias. The result from the test should show that all items do not form into a single factor and that the variance of the first factor needs to have a low percentage of the total variance (Chang, Witteloostuijn, & Eden, 2010). The result of EFA shows that the largest variance explained by an individual factor is 34.45%. This indicates that none of the factors can explain the majority of the variance. Thus, common method variance is not a concern. The analysis supports the sufficient reliability and validity for the research model.

4.5 Evaluation of Structural Model

Structural model evaluation is the second step in PLS analysis. The outcomes of this analysis are hypotheses testing and the predictive power of a research model. Factors that predict online health information use are health concern, perceived convenience, skill, empowerment, and satisfaction, (i.e. predicted by quality of content, accessibility, and credibility). The model explained 71% of the variance in online health information use and 24% of the variance in satisfaction (see Figure 4.2). The researcher further analyzed the mediating effect of satisfaction between quality of website design, quality of content, accessibility, credibility, and online health information use. Based on the results, 11 of the research hypotheses were supported (see Table 4.6). The predictive relevance (Q^2) values larger than zero for a specific reflective endogenous latent variable indicate the path model's predictive relevance for a particular construct (Hair et

al., 2011). The result shows that all Q^2 values are above zero, thus providing support for the model's predictive relevance for the two endogenous constructs (see Table 4.7).

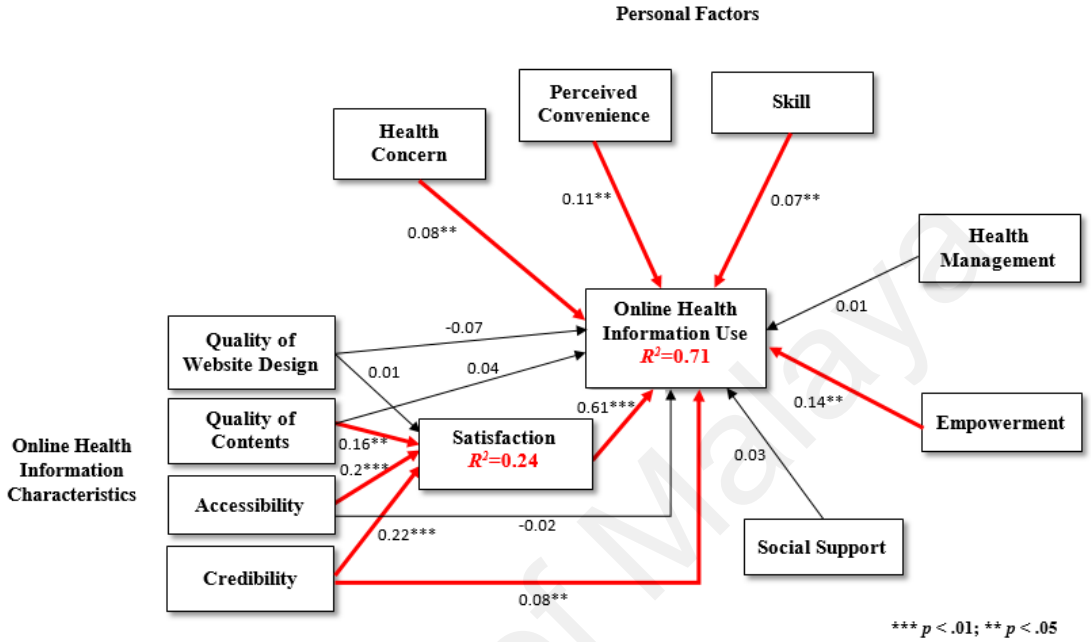


Figure 4.2: Path coefficients of research model

Table 4.6: Hypotheses results

Direct Effects					
Hypothesis	**Relationships**	**Path Coefficients**	***t-value***	***p-value***	**Result**
H1	Health Concern → Online Health Information Use	0.082	2.240**	.025	*Supported*
H2	Perceived Convenience → Online Health Information Use	0.110	2.962**	.003	*Supported*
H3	Skill → Online Health Information Use	0.067	2.087**	.037	*Supported*
H4	Health Management → Online Health Information Use	0.010	0.293	.770	Not supported
H5	Empowerment → Online Health Information Use	0.139	3.207**	.001	*Supported*
H6	Social Support → Online Health Information Use	0.030	0.923	.356	Not supported
H7	Satisfaction → Online Health Information Use	0.613	14.01***	.000	*Supported*
H8a	Quality of Website	0.005	0.081	.935	Not

	Design → Satisfaction				supported
H8b	Quality of Website Design → Online Health Information Use	-0.067	1.699	.089	Not supported
H9a	Quality of Content → Satisfaction	0.162	2.166**	.030	*Supported*
H9b	Quality of Content → Online Health Information Use	0.035	0.667	.505	Not supported
H10a	Accessibility → Satisfaction	0.196	4.16***	.000	*Supported*
H10b	Accessibility → Online Health Information Use	-0.015	0.414	.679	Not supported
H11a	Credibility → Satisfaction	0.216	3.351***	.001	*Supported*
H11b	Credibility → Online Health Information Use	0.078	2.178**	.029	*Supported*
Indirect Effects					
H12	Quality of Website Design → Online Health Information Use	0.046	0.775	.219	Not supported
H13	Quality of Content → Online Health Information Use	0.054	1.953	.026	Not supported
H14	Accessibility → Online Health Information Use	0.033	4.584***	.000	*Supported*
H15	Credibility → Online Health Information Use	0.049	2.929***	.002	*Supported*

Notes: *** $p < .01$; ** $p < .05$

Table 4.7: Coefficient of determination (R^2) and predictive relevance (Q^2)

Endogenous Latent Variable	**R^2 Value**	**Q^2 Value**
Online Health Information Use	0.708	0.458
Satisfaction	0.242	0.207

Additional assessment for the structural model addresses the f^2 and q^2 effect sizes. Table 4.8 summarizes the results of effect sizes for all the relationships in the model. The value of 0.02, 0.15, and 0.35 are interpreted as small, medium, and large effect sizes, respectively (Hair, Ringle, & Sarstedt, 2013). The f^2 effect size on the relationship between satisfaction and online health information use can be considered medium. All other relationships had small f^2 and q^2 effect sizes.

Table 4.8: Summary of f^2 and q^2 effect sizes

	Path Coefficients	f^2 effect size	q^2 effect size
Online Health Information Use			
Health Concern	0.087	0.010	0.006
Convenience	0.103	0.020	0.007
Skill	0.073	0.010	0.005
Health Management	0.022	0.000	0.000
Empowerment	0.150	0.033	0.013
Social Support	0.006	0.000	0.001
Satisfaction	0.632	0.997	0.366
Satisfaction			
Quality of Website	0.057	0.001	0.003
Quality of Content	0.167	0.016	0.014
Accessibility	0.241	0.047	0.041
Credibility	0.228	0.025	0.026

4.6 Discussion of Findings

EFA was performed to address the first research question which is to determine factors for the enhanced research model that predict the online health information use by urbanized Malaysian women. The rotated factor solution specifically the varimax rotation was used to maximize the variance accounted for by each factor, resulting in a yield of 11 factors. The findings reveal that six factors represent the online health information user's personal factors. Health concern, perceived convenience, skill, health management, empowerment, and social support are the possible factors that influence online health information use.

Online health information characteristics consist of four factors; quality of website design, quality of content, accessibility, and credibility. Satisfaction is a mediating factor between online health information characteristics and online health information use. Compared to other models in the previous online health information studies (Hong, 2006; Kim et al., 2012; Lemire, Paré, et al., 2008; Park et al., 2009; Xiao et al., 2014; Yoo & Robbins, 2008; Yun & Park, 2010), the researcher are integrating

factors that represent users and online health information characteristics in order to understand the influence of both spectrums on online health information use.

The second research question is to determine the factors significantly associated with online health information use by urbanized Malaysian women. The strongest predictor of online health information use is satisfaction. The results show that quality of content, accessibility, and credibility positively associated with satisfaction. Satisfaction also mediates the effect between accessibility, credibility and online health information use. Users will be more likely to use online health information if satisfaction with these characteristics can be fulfilled. The European Commission in its code of conduct listed accessibility among the main criteria for health website design (McInnes & Haglund, 2011). In the absents of physical cues in a virtual environment, credibility has been used as a benchmark for online health sources to foster a sense of trustworthiness towards these sources. Moreover, information obtained was used for decision making (Powell et al., 2011), changing health actions (Ybarra & Suman, 2008), or communicating with doctors (Gallagher, Tedstone Doherty, Moran, & Kartalova-O'Doherty, 2008), thus, health consumers who are satisfied with the credibility of the website is more likely to use online health information.

There is no significant association between quality of website design and satisfaction. Users did not put emphasis in the design when using health information website compared with other forms of Internet usage such as online shopping or other e-commerce transaction (Kim, Ferrin, & Rao, 2008; Shin, Chung, Oh, & Lee, 2013). These results imply that online health information consumers are more concerned about the content than the physical attributes of the source.

The personal factors, which refers to empowerment, health concern, perceived convenience, and skill, were important factors in using online health information for

urbanized Malaysian women. Empowerment is a strong predictor in motivating users to use online health information. Having access to health information can strengthen knowledge thus enabling people to take action and increase personal responsibility in maintaining good health. With sufficient information at hand, people can take appropriate actions in managing their health. As the responsibility for personal health has shifted from health professionals to individual care (Hervik & Thurston, 2016; Lee & Hawkins, 2010), people are becoming more proactive in taking care of their health.

Perceived convenience is another important factor in using online health information sources as it can ease the burden in the searching process, especially for the less skillful or time constraint consumers. General search engines are much preferred compared to direct access to specific websites that offer high quality of health information (e.g. WebMD, National Institute of Health website). The hassle to find specific health websites and complexity of navigating the web might put off the intention for more extensive use. Undoubtedly, there is a need for a much simpler approach that can assist online health consumers in finding reliable health information. The importance of perceived convenience can also be seen in other fields of study especially in e-commerce and mobile transaction (Ozturk, Bilgihan, Nusair, & Okumus, 2016; Teo, Tan, Ooi, Hew, & Yew, 2015). Internet usage is not only limited to health information seeking, but other activities such as online transaction, online shopping as well. Thus, users who were used to the simplicity and convenience that these services provide tend to expect the same features from online health information sources.

Health concerns motivate people to search for information about their conditions, especially the causes, severity of the situation, and available treatment. Consultation with doctors have often left people with more lingering questions with some facing difficulties in understanding medical terms (Zhang et al., 2009). Besides, by being better informed, health consumers can take appropriate actions and cope with

the situation. The feeling of being powerless when facing health problems can be eased by knowing what the person is dealing with. Health consumers seek out online health information out of curiosity (Suziedelyte, 2012; Xie, 2012) or they are health-conscious (Yun & Park, 2010). Health-conscious consumers could enrich their knowledge by getting information needed in managing health from the Internet, as it is an limitless source of health information. The results corroborate findings from other studies that found concern over personal health contribute to the acceptance of online health information (Beck et al., 2014; Hardiker & Grant, 2011).

In searching for online health information, users depend on their ability to judge the retrieved results. Search results are based on ranking or sorting criteria of the search engines and are subject to biases. Therefore, users must have skills in the search process and ability to understand what is shown to them. Apart from strengthening users' skills, there is a need for an application that only retrieves information from reliable sources and displays it in a form that is easy for users to read and make a comparison between sources thus saving time while providing them with credible information. Doctors or health professionals can play their part by suggesting a list of reliable websites that users can refer to in order to know more about their conditions (Lee, Hoti, Hughes, & Emmerton, 2014).

The result shows that health management and social support are not predictors to online health information use in this particular study. In previous studies, patients and older adults are more likely to use online resources in order to get information about doctors, health facilities, or available treatments (Chu, Huber, Mastel-Smith, & Cesario, 2009; Muhamad et al., 2011). We can assume that online health information use for health management is important for those who face greater health risk as it impacts the decision making over personal health care and treatment (Gilmour, 2007). Urbanized Malaysian women also did not use online health information for social support. Help

gained from relationships and social support is relevant to people dealing with similar health issues or to those overcoming health problems such as cancer (Lee & Hawkins, 2010; Yoo et al., 2013). Social support can be observed among users who wished to discuss their health problems and to communicate with experts such as a physiotherapist as a means of gaining support (Antypas & Wangberg, 2014). Therefore, it can be assumed that the participants for this study less likely deal with illnesses, but instead use the information to enhance their knowledge about health. Another assumption that can be made is a culture where personal health information is not shared openly with others. Findings from a study stated that Asian patients were mostly embarrassed of their illnesses and hesitated to discuss it with others (Lee et al., 2013).

CHAPTER 5: PROTOTYPE DEVELOPMENT AND EVALUATION

5.1 Introduction

Understanding user requirements is a prerequisite for developing an effective consumer health information resource. To address the third research objective and research question, significant factors of OHIUM provided a direction in designing and developing the research prototype, Online Health Information Resource (OHIR) prototype. A linear-sequential life cycle model or waterfall model guided the process in developing the prototype. Based on the waterfall model (Avison & Fitzgerald, 2003), the development of OHIR prototype can be categorized into four phases (see Figure 5.1). Waterfall model applies sequential development process. Thus, each phase must be completed before implementing the next phase.

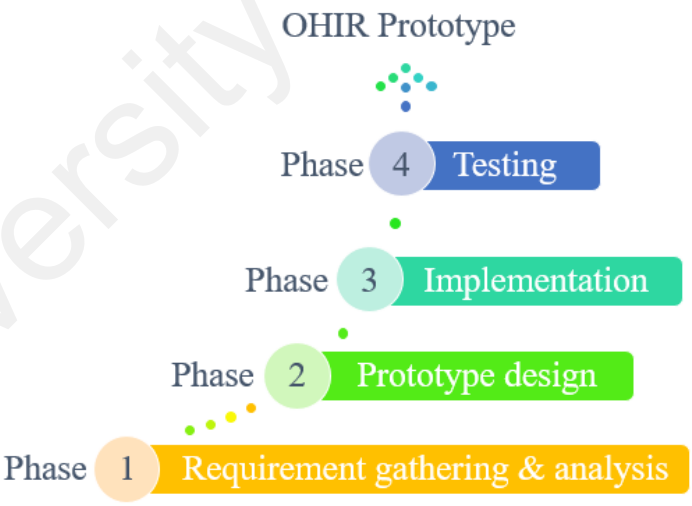


Figure 5.1: OHIR prototype development phases

The first phase refers to requirement gathering and analysis. According to the waterfall model, requirements for prototype should be clear before continuing to the next phase of design. Requirement gathering and analysis was completed through data collection and OHIUM validation. The significant factors of OHIUM are satisfaction, empowerment, perceived convenience, health concern, skill, credibility, accessibility, and quality of content. These factors guided the implementation of features in the OHIR prototype design.

The second phase, prototype design, involves implementation of the requirements gathered in the first phase into OHIR prototype design. The significant factors of OHIUM was transformed into the functional features of the prototype. Factors such as satisfaction and skill could not be directly translated as functional features in prototype development but only be observed during testing phase. In the third phase which is implementation, the OHIR prototype design was developed into a functioning prototype. The final phase refers to testing of OHIR prototype. Testing only begins after the development is completed. The following sections discuss the prototype design, implementation, and testing in detail.

5.2 Prototype Design and Implementation

Transforming research findings into OHIR prototype involves identifying and incorporating features from significant factors in OHIUM into design and development. Incorporating these features into the OHIR prototype may make it more appealing and more valuable to the users. Table 5.1 shows the mapping of each factor to the functional implementation of the OHIR prototype.

Table 5.1. Mapping significant OHIUM factors to OHIR prototype

Factors	OHIR Prototype Design
Accessibility Content of the prototype can easily be found and usable by everyone.	Returned results coming from multiple resources. The prototype will act as a gateway to reliable resources. These resources might provide different perspectives or information towards certain health issues giving users diverse knowledge on a health topic. Users would benefit from the ability to compare varying sources of online health information.
Convenience How users perceived the convenience in using the prototype in terms of ease of use and amount of effort required to complete a given task.	The prototype does not require any login for searching and browsing. The prototype also allows users to save the information found but they are required to have an account to do so. The results were shown in different tabs for ease of viewing. The details of each health topics presented by categories: i. General Information ii. Symptoms iii. Diagnosis and Tests iv. Prevention and Control v. Treatments and Therapies This will provide the ability for users to select a suitable category of returned results. It also provides the ability to switch between categories and compare the information from different sources on similar items.
Health Concern Health-related matters that affect the use of the prototype as an online health information resource.	The prototype allows users to share the information with others through email as well and social media. Users can save an article if they wish to further research an illness they might be dealing with.
Empowerment Using the prototype enabled users to accomplish tasks.	Latest news section provides latest information on current health concerns such as disease outbreaks that can help in prevention and precaution.
Quality of content Content and features of the prototype denotes high quality and worthiness.	The content available is highly informative as it covers important and pertinent information in the search for health information (i.e. General Information, Symptoms, Diagnosis and Tests, Prevention and Control, Treatments and Therapies).

Factors	OHIR Prototype Design
	The sections were also designed in a way to allow users to compare between sources and select the categories that they want to focus on.
Credibility Information available in the prototype come from trustworthy sources.	The information is sourced from multiple trustworthy sources where legalities such as disclaimers, privacy policy, disclosures, and copyright of the information are available.

The web-based OHIR prototype was developed using website building tool GoDaddy Website Builder as it supports the development of the features needed for the prototype. The web-based OHIR prototype domain name was registered and also hosted using the same provider. The content of OHIR prototype was cited from multiple resources providing online health information (i.e. Medline Plus, Centers for Disease Control and Prevention, National Health Service, and MedicineNet) hence the available content is in English. The prototype allows users to share the information with others through email as well and social media (see Figure 5.2). Users can save an article if they wish to keep the information found but they are required to have an account to do so (see Figure 5.3). To save an article, user are required to sign up and login. User can view latest information on current health concerns such as disease outbreaks that can help in prevention and precaution in news section (see Figure 5.4).

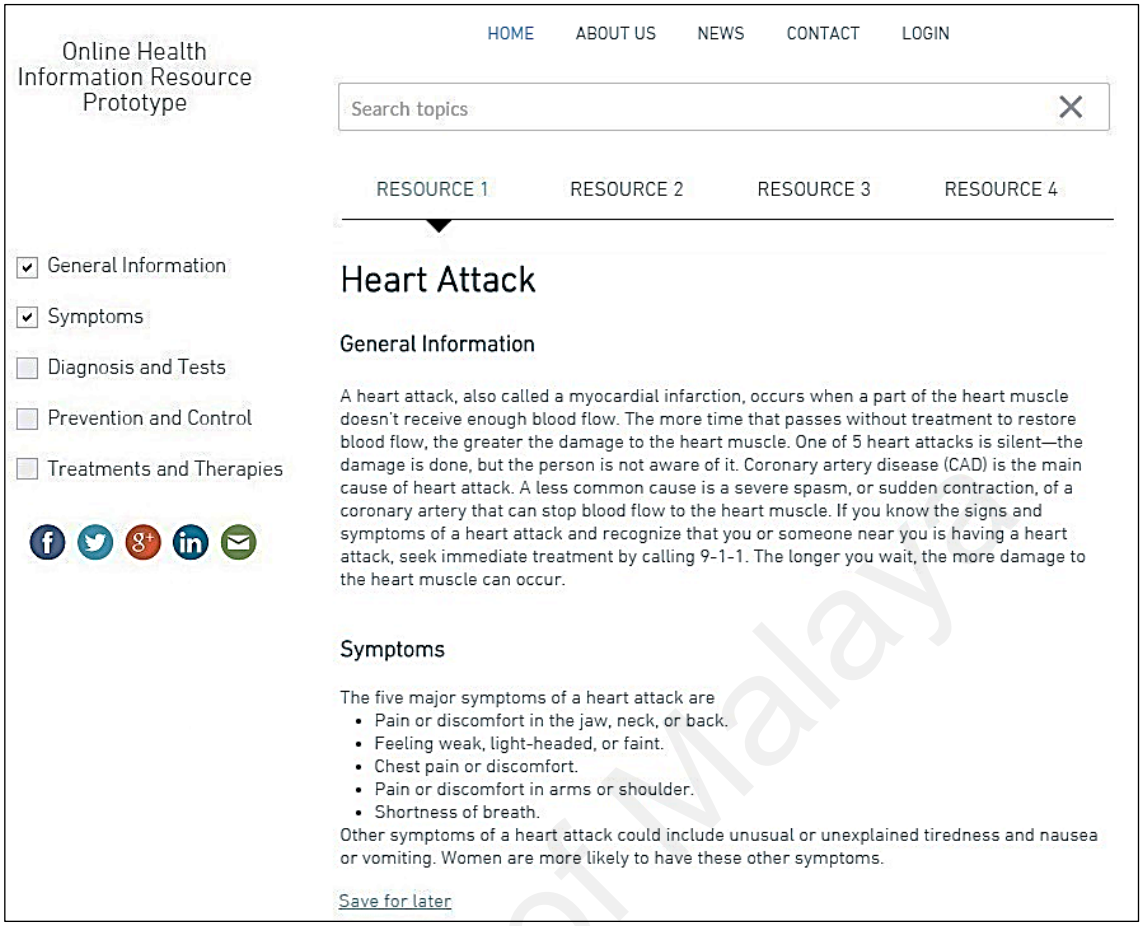


Figure 5.2: OHIR prototype main page

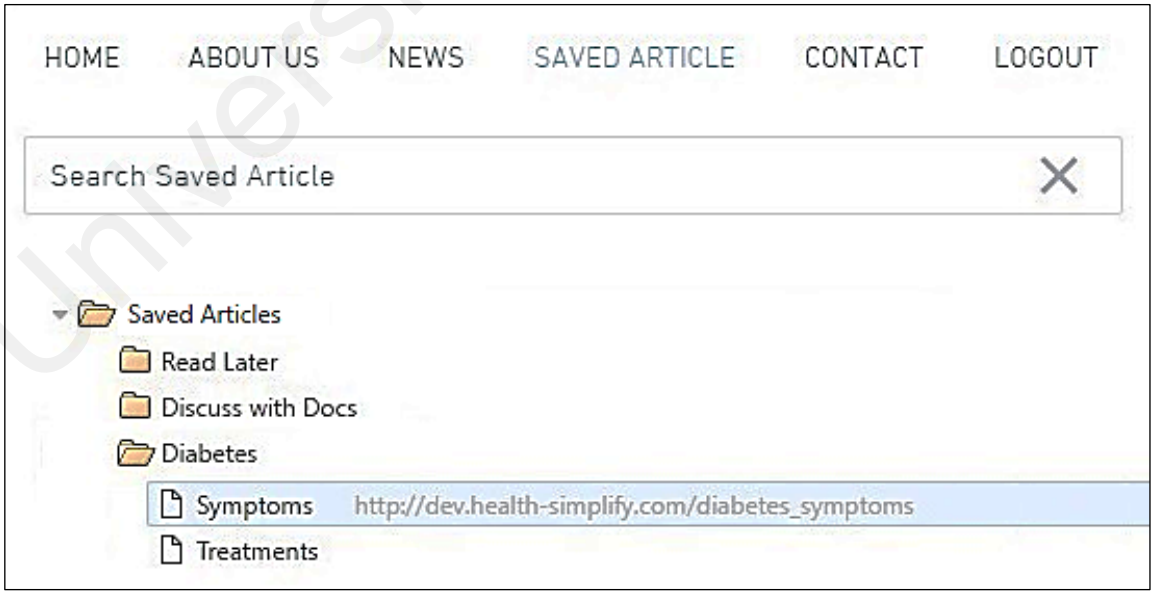


Figure 5.3: Saved article section

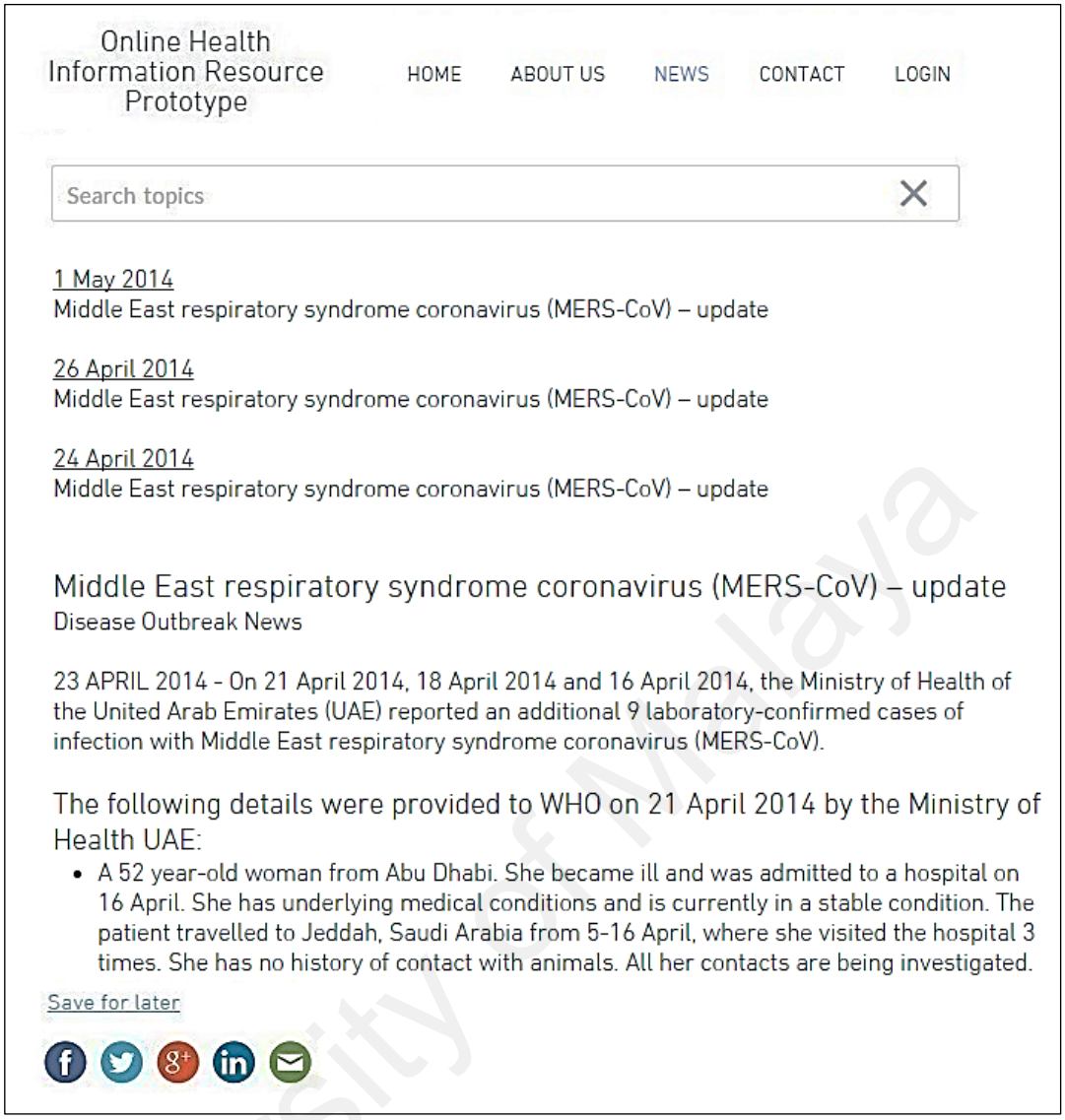


Figure 5.4: News section

5.3 Prototype Evaluation

The study aims to understand how the OHIR prototype can be developed based on the factors identified in the research model, OHIUM. The prototype is a web-based system meant to test the implementation of OHIUM. Upon completion of the implementation phase, the prototype was pilot tested to identify any broken links and unresponsive pages. A convenient sample of five Malaysian female participants, aged 18 years and above was recruited for the pilot test. The link of web-based OHIR prototype was given to the participants together with the instructions for testing. Participants reported no

obstacles in using the prototype and was able to follow the instructions without any difficulties. Overall, the time needed to complete the tasks for user testing is around 20 minutes.

The final phase, prototype testing was conducted from October to November 2014. Fifty email invitations were sent out to the participants involved in the survey questionnaire for OHIUM validation and only 12 responded. The invitations were extended to other members of the public to get more responses via multiple channels, such as health groups' mailing list and social media such as Facebook. The researcher were able to get 30 respondents to participate in the testing.

The OHIR prototype is a web-based prototype where users can access and evaluate the prototype online. The participants were given the link to access the OHIR prototype via email together with an introduction to the prototype, its functions, and the available information stored in the prototype. The instructions given to the participants include the tasks and topic to search using the prototype. As a study of comparison, participants were also asked to perform similar tasks using resources they commonly utilize when searching for online health information. Time is needed to build confidence and familiarity in using the prototype. For that reason, participants were given one month to access the prototype. Contact detail of the researcher was included and participants were encouraged to communicate with the researcher if they face any difficulties or have any questions about the prototype or instructions given. A reminder email was sent out to the participants to perform the given tasks and to complete the evaluation form before the testing period end. Participants received no incentive to take part in the OHIR prototype testing.

In line with the third research objective and research question, the evaluation questions were used to validate the development of the OHIR prototype based on the

significant factors of OHIUM. The evaluation items for prototype testing was adapted from the survey questionnaire. However, only items related to the factors being evaluated in the prototype were included, that is, perceived convenience, skill, health concern, empowerment, quality of content, credibility, and satisfaction. Demographic questions were also included in the survey. In the last section of the survey, respondents can provide comments and recommendations about the prototype. Two sets of instructions and evaluation questions in both English and Bahasa Melayu were available for participants (please see Appendix C). Descriptive analysis using SPSS version 20 was performed on the data collected for OHIR prototype testing. Table 5.2 show the overall mean value for each factors. Please refer to Appendix D for the comprehensive results of survey items.

Table 5.2: Evaluation of OHIR prototype

Constructs	**Mean**
Perceived convenience	
Perceived convenience in using the prototype	4.36
Perceived convenience in using other resource	3.86
Skill	
Skill in using the prototype	3.80
Skill in using other resource	4.03
Health concern	
Health concern in using the prototype	3.97
Health concern in using other resource	4.40
Empowerment	
Empowerment in using the prototype	4.23
Empowerment in using other resource	3.66
Quality of content	
Quality of prototype content	4.20
Quality of other resource content	4.00
Credibility	
Credibility of prototype content	4.00
Credibility of other resource content	3.92
Accessibility	
Accessibility of the prototype	4.14
Accessibility of other resource	3.60
Satisfaction	
Satisfaction with the prototype	3.70
Satisfaction with other resource	3.73

Overall, 30 participants took part in the prototype testing. The average age was 29 with the range from 23 to 48 years old. The highest percentage of online search activity for health information is once a month with 42.7%. Participants commonly use search engines (87.3%) when searching for information. Most of the participants that depend on search engines could not identify the source of health information and some participants stated that the information they referred to came from Wikipedia or blogs. Another 12.7% reported using authority-based websites (e.g. Ministry of Health, Hospitals, MyHEALTH portal, WebMD, World Health Organization) as sources of health information.

Based on the prototype evaluation data analysis, perceived convenience, empowerment, quality of content, credibility, and accessibility of OHIR prototype rated higher than the other resources use for online health information by users. It shows that participants appreciated the features of OHIR prototype in terms of fulfilling their needs when using online resources for health information. The information presented in the prototype came from multiple trustworthy sources which provided an opportunity to understand the topic from different perspectives. This can save time as users do not have to go through search results to find the most relevant answers to their questions. Moreover, using the prototype can eliminate problems that come with using search engines such as yielding unreliable results, biased information, and product endorsements.

The design allows quick access to different sections as it was divided into several categories; general information, symptoms, diagnosis and tests, prevention and control, treatments and therapies. The latest news section provided current health concerns such as disease outbreaks that help in prevention and precaution. Development of online systems should adopt user-centered design (Nath et al., 2015). Overall, user satisfaction with OHIR prototype is about the same with satisfaction from using

resources they commonly use. This shows that by implementing features that can fulfill users need, users are able to accept a newly developed system as they appreciate the value it brings to them.

Finding the right information is a problem often as a result of the mismatch between health website designs and the needs of health information users, in particular, the lack of support to explore health information (Pang, Chang, Verspoor, & Pearce, 2016). With this mind, the OHIR prototype development is built around health information from multiple resources. These resources might provide different perspectives or information towards certain health issues giving the users diverse knowledge about a health topic. Users would benefit from the ability to compare varying sources of online health information. People will make better decisions and choices if provided with the right types of information.

Only few respondents provided feedback on the comments and recommendation section. Among the feedback is: “My frequently used resource encompass a lot of resources not limited to NHS and CDC. The search engine could link to blogs or forums where people discuss health issues. I think this is especially useful." Another participant also recommended that health forums be included in the prototype, “should include health forums to check on people’s testimony." Forum is commonly used for social support (Yan & Tan, 2014) and not included as an OHIR prototype feature as the objective is to develop the prototype based on the significant factors of OHIUM. One of the participant commented, “Earlier I was confused to use the prototype but after a while I regain control of what info I want to find out from the prototype”. This shows that the duration of one month allowed participants to explore the prototype and use it with confidence. When designing online health services, the needs of the users must be prioritized (Crotty et al., 2016). Overall, OHIR prototype improves the user experience of health information seeking and better support the needs of health information

seekers. It can be concluded from the prototype evaluation that the significant constructs of OHIUM can be used to develop a working prototype that can satisfy users' needs.

CHAPTER 6: CONCLUSION, LIMITATION, AND FUTURE WORK

6.1 Conclusion

The purpose of this study is to investigate the use of online health information by urbanized Malaysian women. Understanding the factors contributing to online health information use is essential in developing an effective consumer health information resource. Research activities carried out in this study began with understanding the current state of online health information research. The review provides understanding of purpose, prevalence, effect, and challenges related to online health information activities. Also, user characteristics and findings related to online health information resources was reviewed. Quantitative approach was employed in finding answers to the research questions posed in this study. Thus, presented here are the research objectives, research questions, and the findings.

Research Objective 1: To identify factors for an enhanced research model that predict online health information use by urbanized Malaysian women.

Research Question 1: What are the possible factors for the enhanced research model that predict the online health information use by urbanized Malaysian women?

In order to identify factors for an enhanced research model that predict online health information use by urbanized Malaysian women, the researcher examined the theoretical approach and research models developed by past studies. Based on that review, this study proposed an enhanced research model, OHIUM, which consists of personal factors and online health information characteristics. Six factors represented

the online health information user's personal factors, that is, health concern, perceived convenience, skill, health management, empowerment, and social support. Online health information characteristics consist of four factors; quality of website design, quality of content, accessibility, and credibility. Satisfaction was a mediator between online health information characteristics and online health information use.

Research Objective 2: To develop an online health information use model based on the identified factors in Research Objective 1.

Research Question 2: How can an online health information use model be developed based on the identified factors?

The second research objective is to determine significant factors that affect online health information use by urbanized Malaysian women. Using data collected from the survey, the model was tested and the findings provide support for the hypothesized relationships and predictive value of the model. Factors that affect online health information use by urbanized Malaysian women are; satisfaction, empowerment, perceived convenience, health concern, and skill. Satisfaction was predicted by credibility, accessibility, and quality of content. Seventy-one percent of the variance in online health information use was explained by the hypothesized predictors. The study provides valuable insights into the importance of integrating both personal factors and online health information characteristics as an enhanced model to better predict online health information use.

Research Objective 3: To develop an online health information resource prototype based on the validated online health information use model.

Research Question 3: How can an online health information resource prototype be developed based on the validated online health information use model?

The criteria for Online Health Information Resource (OHIR) prototype development was based on the significant findings. The OHIR prototype was developed to provide health information from multiple reliable sources as the credibility and quality of content are important criteria to health consumers. The prototype presented information with feature that enable users to read and compare information from different sources with ease. The details of each health topics presented by categories for ease of access, for example, general information, symptoms, diagnosis and tests, prevention and control, and also, treatments and therapies. This not only provide users with a breadth of information but also details on the disease.

6.2 Implication of Research

This research provides several important implications in the field of online health information study. The findings contribute to the deepening of our understanding of online health information use of urbanized Malaysian women, the development of an enhanced research model and a prototype. The study contributes to the knowledge of how the Internet is used as a tool to provide health information and how to exploit the technology to its fullest and its most beneficial potential. Therefore, to understand the reason people use resources like the Internet for health information is of utmost importance. As a result, we are able to develop technologies to meet unique needs of users and is useful to the greater population.

With the increased understanding of online health information use, recommendations can be made to promote websites delivering health information of higher quality in terms of content and usability, that can empower users and enhance the overall user experience. Based on the findings of this study, governments, organizations, professionals and other entities can utilize the technology to promote better health management plan and prevention among society. For instance, health promotion agencies can create awareness programs to encourage the public to use the Internet as a cost-effective medium in retrieving health information. As most people in developing countries still heavily rely on their physicians and other passive medium like print media, radio and television (Garcia-Cosavalente et al., 2010; Mohd-Nor et al., 2013) which provide important but limited information, they should be encouraged to be better informed and take the self-initiative to learn by accessing the Internet as a source of reliable health-related information.

Theoretical implication of this study can be seen by the results demonstrated by the predictive power in comparison to the results of previous research models as been discussed in section 2.2. This indicates that an enhanced research model combining personal factors and online health information characteristics can improve the model proposed in the field of online health information study. As a result, the study have increased the understanding of factors influencing online health information use.

Furthermore, the findings from this study can advise online health information providers on the important aspects for design and development. The research provides practical aspects in creating a better user-centric online health information resources. As shown by the findings, various factors determine online health information use. These factors can be implemented in designing and developing resources that can meet the needs of users. This will improve the implementation and increase user experience and engagement with online health information sources.

6.3 Limitation and Future Work

Despite the meaningful findings, there are several limitations to this study that should be acknowledged. Use of online survey allow the researcher to reach the highest number of people in the right population to obtain the most sufficient data for hypotheses testing. While this can be considered as a strategic effort, it was limited in terms of the sample population characteristics. The population surveyed were primarily people with Internet access and involved in online activity such as using email. The study sample's homogeneous characteristics in terms of socio-economic variables such as income and education may have influenced the findings. Therefore, caution must be taken when trying to generalize the findings to the larger population.

The factors of this study consists of personal factors and online health information characteristics. There could be other factors that also contribute to determining online health information use among urbanized Malaysian women. With that said, there will be no single study that can or should cover all possible relationships caused by various contributing factors. Also, the problem related to self-administered survey should be noted. Bias due to response selectivity can be a concern with self-administered questionnaires. For instance, selective memory in remembering past experiences may affect responses and those who are not interested in this topic may be less likely to respond to the survey.

Prototype testing involved 30 respondents and they were given instructions on the exact topic to search using the prototype and using methods commonly adopted in seeking health information. Since the testing was conducted once, and specific instructions were given for the types of information that users were required to search, it is not possible to understand the effect of personal factors, for example, health concerns during the evaluation as respondents rated health concern in using other resources

higher than in using the prototype. It can be assumed that the more people used a resource for health information, the more comfortable they are to depend on the resource to address their health concerns.

Further studies may explore other factors for possibilities of extending the presented research model, OHIUM. Possible moderator such as health literacy should be considered to gain knowledge of how it affects the relationships between the factors. As for the OHIR prototype, future work should incorporate other health databases for variety. Another interesting aspect that should be explored is the element of social interactions between online health information users. Even though social support was found to be insignificant, an observation of this aspect can provide a comparison of social interactions in health settings and other circumstances such as educational, entertainment and others. Also, investigation on actions taken with the information and influence of this information on health and lifestyle will be useful for a more comprehensive understanding of the matter. Providing people with online health information alone is not always enough. Online health information resources must be linked to or enhanced within other services that can respond to the needs of health information users.

Future research should also explore the specific interest of online health information users, for example, the type of health information they sought under particular circumstances (i.e. age, gender, health status) to provide more relevant, useful information and for future health promotion. Many obstacles remain unaddressed before the full potential of the Internet in empowering society with health information can be greatly utilized. Therefore, further research is necessary to improve the current study to help encourage people to adopt and sustain their engagement with online health information resources.

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APPENDIX A

SURVEY QUESTIONNAIRE

FACULTY OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

"I'm a Malaysian women and I use the Internet to search for health information" - If you fulfil these criteria, you are welcome to participate in this study. The following survey is part of a study to evaluate online health information seeking activity among Malaysian women. By responding to the survey, you will contribute to a better understanding about the topic. All the information from your response will be kept confidential and used exclusively for the purpose of the study. **Please note that respondents should be Malaysian women only. Do not answer this survey if you do not meet the criteria.** If you have any questions, please feel free to contact the researcher:

Syarifah Norfadzila Bt. Wan Aderus (sfadzila@um.edu.my)
Ph.D. Candidate
Faculty of Computer Science & Information Technology
University of Malaya, 50603 Kuala Lumpur

Part A

In the following sections, please select the appropriate answer(s).

A1. Age
- ☐ 18-29
- ☐ 30-49
- ☐ 50-64
- ☐ 65 and above

A2. Current household income
- ☐ 1,000 and below
- ☐ 1,001–4,000
- ☐ 4,001 – 7,000
- ☐ 7,001 and above

A3. Highest level of education completed
- ☐ Primary School
- ☐ Secondary School
- ☐ College/University

A4. I usually search health related information for **(may choose more than 1 answer)**
- ☐ Myself

- ☐ Family
- ☐ Friends
- ☐ Other. Please specify: _____

A5. The number of websites per each visit
- ☐ 1 site
- ☐ 2-5 sites
- ☐ 6 sites and more

A6. The average duration taken each time looking for health information using Internet
- ☐ Less than 1 hour
- ☐ 1-5 hours
- ☐ More than 5 hours
- ☐ Other. Please specify: _____

A7. My experience of using the Internet (for any purposes)
- ☐ Less than 1 year
- ☐ 1-5 years
- ☐ More than 5 years

A8. I usually start my search
- ☐ Using general terms
- ☐ Using medical terms (e.g. diagnosis, drugs names)
- ☐ Using questions I would have asked doctors (e.g. "What is the symptoms of the infection?")
- ☐ Using queries (e.g. AND, OR, NOT)
- ☐ Other. Please specify: _____

A9. My overall frequency of using the Internet to search for health information
- ☐ Once a day
- ☐ Once a week
- ☐ Once a month
- ☐ Few times a day
- ☐ Few times a week
- ☐ Few times a month
- ☐ Other. Please specify: _____

A10. Sources that I prefer when looking for health information **(may choose more than 1 answer)**
- ☐ Doctors/Health Professionals
- ☐ Internet
- ☐ Books
- ☐ Magazines
- ☐ Newspapers
- ☐ Television
- ☐ Radio
- ☐ Family/friend advice
- ☐ Other. Please specify: _____

Part B

In the following sections, please indicate your **level of agreement** based on the scale:

1-Strongly Disagree 2- Disagree 3-Neutral 4-Agree 5-Strongly Agree

B1	I have enough computer skills to use health related websites	1	2	3	4	5
B2	I am confident gathering information on the Internet	1	2	3	4	5
B3	I am confident with my ability to use the web for seeking health information	1	2	3	4	5
B4	I am able to use health related websites without another person's assistance	1	2	3	4	5
B5	I am able to evaluate the quality of health information on health related websites	1	2	3	4	5
B6	I always understand the health information found online	1	2	3	4	5
B7	I feel that I am in control of how and what I learn about my health using the Internet	1	2	3	4	5
B8	It is quite simple to get online health information whenever I want to	1	2	3	4	5
B9	I can easily find health information from website anywhere I want to	1	2	3	4	5
B10	I often feel guilty for not doing enough to improve my personal health	1	2	3	4	5
B11	I believe I can prevent illness by adopting a healthy lifestyle	1	2	3	4	5
B12	I believe I can improve quality of life by equipping myself with up-to-date health information	1	2	3	4	5
B13	My personal health condition motivates me to seek for online health information	1	2	3	4	5
B14	I often feel powerless when faced with health problem	1	2	3	4	5

My purpose for searching online health information:						
B15	Get information on medicines	1	2	3	4	5
B16	Get information on treatments/therapy	1	2	3	4	5
B17	Make decisions about health care needs	1	2	3	4	5
B18	Get general health information	1	2	3	4	5
B19	Get a variety of information from different sources	1	2	3	4	5
B20	Get information about health problem or illness	1	2	3	4	5
B21	Get information on disease preventions	1	2	3	4	5
B22	Get support, help and advice from other people with similar health conditions	1	2	3	4	5
B23	Offer support, help and advice to other people with similar health conditions	1	2	3	4	5
B24	Interact with people with similar health conditions	1	2	3	4	5
B25	Share information with people with similar health conditions	1	2	3	4	5

Part C

In the following sections, please indicate your **level of satisfaction** based on the scale:

1-Very dissatisfied 2-Somewhat dissatisfied 3-Fairly satisfied 4-Very satisfied 5-Completely satisfied

Level of satisfaction with quality of online health information contents						
C1	Relevant contents	1	2	3	4	5
C2	Informative contents	1	2	3	4	5
C3	Well-organized contents	1	2	3	4	5
C4	Trustworthiness of contents	1	2	3	4	5
C5	Information easy to understand	1	2	3	4	5
C6	Use of simple and clear language	1	2	3	4	5
C7	Useful information	1	2	3	4	5
C8	Accurate information	1	2	3	4	5
C9	Current information	1	2	3	4	5
Level of satisfaction with quality of health information website design						
C10	Search of audio and video	1	2	3	4	5
C11	Automatic translation of results to other language	1	2	3	4	5
C12	Support on how to search for information (e.g. web chat, help feature)	1	2	3	4	5
C13	Medical dictionary/thesaurus	1	2	3	4	5
C14	Visual representation of related words (e.g. "word cloud"-a technique to represent the most common terms)	1	2	3	4	5
C15	Ability to listen to the text and save it as audio file	1	2	3	4	5
C16	Sharing/tagging search results via social network	1	2	3	4	5
C17	Multiple modes of information in a single medium (e.g. text, picture, video, etc.)	1	2	3	4	5
Level of satisfaction with credibility of online health information						
C18	Display authorship for the contents (e.g. author's name, ownership, credentials)	1	2	3	4	5
C19	Display legal prove (e.g. privacy policy, disclosures, disclaimers, copyright statements)	1	2	3	4	5
C20	Display contact information (e.g. feedback, fax, e-mail)	1	2	3	4	5
C21	Provide useful links to reliable health information resources	1	2	3	4	5
Level of satisfaction with accessibility of online health information						
C22	Free access to contents (without any fees)	1	2	3	4	5
C23	No membership requirement in order to access health information	1	2	3	4	5

Part D

In the following sections, please indicate your **level of agreement** based on the scale:

1-Strongly Disagree 2- Disagree 3-Neutral 4-Agree 5-Strongly Agree

Satisfaction						
D1	I am satisfied with the accessibility to health information website	1	2	3	4	5
D2	I am satisfied with the credibility of the health information website	1	2	3	4	5
D3	I am satisfied with the quality of the website	1	2	3	4	5
I use health related website because						
D4	I use online health information to empower myself	1	2	3	4	5
D5	I use online health information for health management	1	2	3	4	5
D6	I think online health information provide convenience for users	1	2	3	4	5
D7	I use online health information to clarify health concern	1	2	3	4	5
D8	I have skill to use online health information on my own	1	2	3	4	5
D9	I have capability to do so	1	2	3	4	5

Do you have any suggestions/comments?

If you are interested to involve in another part of the study, please leave your contact details:

- ☐ Email: _____
- ☐ Phone: _____
- ☐ Facebook: _____
- ☐ Other. Please specify:_____

Thank you. Your contribution matters.

SOAL KAJI SELIDIK

FAKULTI KOMPUTER SAINS DAN TEKNOLOGI MAKLUMAT

"Saya adalah wanita Malaysia dan saya menggunakan Internet untuk mendapatkan maklumat kesihatan"- Sekiranya anda tergolong dalam kumpulan ini, anda adalah dialu-alukan untuk menyertai soal kaji selidik ini. Soal kaji selidik ini adalah sebahagian daripada kajian untuk menilai aktiviti mencari maklumat kesihatan secara atas talian di kalangan wanita di Malaysia. Dengan menjawab soal selidik ini, anda akan menyumbang kepada pemahaman yang lebih baik mengenai penggunaan dan kehendak mengenai topik ini. Semua maklumat daripada tindak balas anda digunakan semata-mata untuk tujuan kajian. **Sila ambil perhatian bahawa peserta yang diperlukan adalah wanita Malaysia sahaja. Sila abaikan soal kaji selidik ini jika anda tidak menepati kriteria tersebut.** Jika anda mempunyai sebarang pertanyaan, sila hubungi penyelidik:

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Bahagian A
Silih pilih jawapan yang bersesuaian pada bahagian ini.

A1. Umur
- ☐ 18-29
- ☐ 30-49
- ☐ 50-64
- ☐ 65 dan ke atas

A2. Pendapatan semasa isi rumah
- ☐ 1,000 dan ke bawah
- ☐ 1,001–4,000
- ☐ 4,001 – 7,000
- ☐ 7,001 dan ke atas

A3. Tahap pendidikan tertinggi
- ☐ Sekolah Rendah
- ☐ Sekolah Menengah
- ☐ Kolej/Universiti

A4. Saya biasanya mencari maklumat berkaitan kesihatan untuk **(dibenarkan untuk memilih lebih daripada 1 jawapan)**
- ☐ Diri sendiri

- ☐ Keluarga
- ☐ Rakan-rakan
- ☐ Lain-lain. Sila nyatakan:_____

A5. Bilangan laman web bagi setiap sesi lawatan
- ☐ 1 laman
- ☐ 2-5 laman
- ☐ 6 laman ke atas

A6. Anggaran masa yang diambil setiap kali mencari maklumat kesihatan menggunakan Internet
- ☐ Kurang dari 1 jam
- ☐ 1-5 jam
- ☐ Lebih dari 5 jam
- ☐ Lain-lain. Sila nyatakan:_____

A7. Pengalaman menggunakan Internet (untuk apa-apa tujuan)
- ☐ Kurang dari setahun
- ☐ 1-5 tahun
- ☐ Lebih dari 5 tahun

A8. Saya biasanya memulakan carian dengan
- ☐ Menggunakan istilah umum
- ☐ Menggunakan istilah perubatan (cth. diagnosis, nama ubat-ubatan)
- ☐ Menggunakan soalan-soalan yang saya akan tanyakan kepada doktor (cth. "Apakah gejala jangkitan?")
- ☐ Menggunakan *queries* (cth. *AND, OR, NOT*)
- ☐ Lain-lain. Sila nyatakan:_____

A9. Kekerapan menggunakan Internet untuk mencari maklumat kesihatan
- ☐ Satu kali sehari
- ☐ Beberapa kali seminggu
- ☐ Satu kali seminggu
- ☐ Beberapa kali sebulan
- ☐ Satu kali sebulan
- ☐ Lain-lain. Sila nyatakan:_____

A10. Sumber yang menjadi pilihan apabila mencari maklumat kesihatan **(dibenarkan untuk memilih lebih daripada 1 jawapan)**
- ☐ Doktor/Pakar Kesihatan
- ☐ Internet
- ☐ Buku
- ☐ Majalah
- ☐ Surat khabar
- ☐ Televisyen
- ☐ Radio
- ☐ Nasihat dari keluarga/rakan
- ☐ Lain-lain. Sila nyatakan:_____

Bahagian B
Dalam seksyen yang berikut, sila nyatakan tahap persetujuan berdasarkan skala:
1-Sangat Tidak Setuju 2 - Tidak setuju 3-Neutral 4-Setuju 5-Sangat Setuju

B1	Saya mempunyai kemahiran komputer yang cukup untuk menggunakan laman web berkaitan kesihatan	1	2	3	4	5
B2	Saya yakin untuk mengumpul data dan maklumat di Internet	1	2	3	4	5
B3	Saya yakin dengan keupayaan saya untuk menggunakan web bagi mencari maklumat kesihatan	1	2	3	4	5
B4	Saya dapat menggunakan laman web berkaitan kesihatan tanpa bantuan orang lain	1	2	3	4	5
B5	Saya mampu untuk menilai kualiti maklumat kesihatan di laman web berkaitan kesihatan	1	2	3	4	5
B6	Saya sentiasa memahami maklumat kesihatan yang terdapat secara atas talian	1	2	3	4	5
B7	Saya merasakan bahawa saya mempunyai kawalan terhadap bagaimana dan apa yang saya pelajari tentang kesihatan menggunakan Internet	1	2	3	4	5
B8	Saya boleh mencari maklumat yang saya perlukan dengan senang pada bila-bila masa	1	2	3	4	5
B9	Adalah amat mudah untuk mencari maklumat kesihatan dari laman web dimana-mana sahaja	1	2	3	4	5
B10	Saya rasa bersalah kerana tidak meningkatkan kesihatan peribadi saya	1	2	3	4	5
B11	Saya percaya saya boleh mencegah penyakit dengan mengamalkan gaya hidup sihat	1	2	3	4	5
B12	Saya percaya saya boleh meningkatkan kualiti hidup dengan melengkapkan diri dengan maklumat kesihatan terkini	1	2	3	4	5
B13	Keadaan kesihatan peribadi mendorong saya untuk mencari maklumat kesihatan atas talian	1	2	3	4	5
B14	Saya sering berasa tidak berdaya apabila berhadapan dengan masalah kesihatan	1	2	3	4	5

Saya mencari maklumat kesihatan di Internet untuk:						
B15	Mendapatkan maklumat mengenai ubat-ubatan	1	2	3	4	5
B16	Mendapatkan maklumat mengenai rawatan/terapi	1	2	3	4	5
B17	Membuat keputusan tentang bagaimana untuk merawat penyakit	1	2	3	4	5
B18	Mendapatkan maklumat kesihatan am	1	2	3	4	5
B19	Mendapatkan pelbagai maklumat dari pelbagai sumber	1	2	3	4	5
B20	Mendapatkan maklumat tentang masalah kesihatan atau penyakit	1	2	3	4	5
B21	Mendapatkan maklumat mengenai pencegahan penyakit	1	2	3	4	5
B22	Mendapatkan sokongan, bantuan dan nasihat	1	2	3	4	5

	daripada orang lain yang mempunyai keadaan kesihatan yang serupa					
B23	Menawarkan sokongan, bantuan dan nasihat kepada orang lain yang mempunyai keadaan kesihatan yang serupa	1	2	3	4	5
B24	Berinteraksi dengan orang-orang yang mempunyai keadaan kesihatan yang serupa	1	2	3	4	5
B25	Berkongsi maklumat dengan orang-orang yang mempunyai keadaan kesihatan yang serupa	1	2	3	4	5

Bahagian C
Dalam seksyen yang berikut, sila nyatakan tahap kepuasan anda berdasarkan skala:
1-Sangat tidak berpuas hati 2-Agak tidak berpuas hati 3-Agak berpuas hati
4 - Sangat berpuas hati 5 - Teramat berpuas hati

Tahap kepuasan terhadap kualiti kandungan maklumat kesihatan atas talian						
C1	Kandungan yang relevan	1	2	3	4	5
C2	Kandungan berinformasi	1	2	3	4	5
C3	Kandungan yang teratur	1	2	3	4	5
C4	Kandungan yang boleh dipercayai	1	2	3	4	5
C5	Maklumat mudah difahami	1	2	3	4	5
C6	Menggunakan bahasa yang mudah dan jelas	1	2	3	4	5
C7	Maklumat yang berguna	1	2	3	4	5
C8	Maklumat yang tepat	1	2	3	4	5
C9	Maklumat yang terkini	1	2	3	4	5
Tahap kepuasan terhadap kualiti reka bentuk laman web kesihatan						
C10	Pencarian audio dan video	1	2	3	4	5
C11	Terjemahan keputusan secara automatik ke bahasa lain	1	2	3	4	5
C12	Sokongan bagaimana untuk mencari maklumat (cth. *web chat*, bantuan)	1	2	3	4	5
C13	Kamus perubatan/tesaurus	1	2	3	4	5
C14	Visual untuk perkataan yang berkaitan (cth. "*word cloud*"- teknik untuk menggambarkan terma yang paling lazim)	1	2	3	4	5
C15	Keupayaan untuk mendengar dan menyimpan teks sebagai fail audio	1	2	3	4	5
C16	Perkongsian hasil carian / *tagging* melalui rangkaian sosial	1	2	3	4	5
C17	Penyampaian maklumat yang pelbagai di dalam satu medium (cth. teks, gambar, video, dan lain-lain)	1	2	3	4	5
Tahap kepuasan terhadap kredibiliti laman web kesihatan						
C18	Memaparkan pengarang untuk kandungan (cth. nama pengarang, pemilikan, kelayakan)	1	2	3	4	5
C19	Memaparkan bukti sahih (cth. dasar privasi, pendedahan, penafian, penyata hak cipta)	1	2	3	4	5

C20	Memaparkan maklumat untuk dihubungi (cth. maklum balas, faks, e-mel)	1	2	3	4	5
C21	Menyediakan pautan berguna kepada sumber-sumber maklumat kesihatan	1	2	3	4	5
Tahap kepuasan terhadap kebolehcapaian laman web kesihatan						
C22	Akses percuma (tanpa yuran bayaran)	1	2	3	4	5
C23	Keahlian tidak diperlukan sebagai syarat untuk mendapatkan maklumat kesihatan	1	2	3	4	5

Bahagian D
Dalam seksyen yang berikut, sila nyatakan tahap kepuasan anda berdasarkan skala:
1-Sangat tidak berpuas hati 2-Agak tidak berpuas hati 3-Agak berpuas hati
4 - Sangat berpuas hati 5 - Teramat berpuas hati

Kepuasan						
D1	Saya berpuashati terhadap kebolehcapaian laman web kesihatan	1	2	3	4	5
D2	Saya berpuashati terhadap kredibiliti laman web kesihatan	1	2	3	4	5
D3	Saya berpuashati terhadap kualiti laman web kesihatan	1	2	3	4	5
Saya menggunakan laman web berkaitan kesihatan kerana						
D4	Merpekasakan diri dengan maklumat kesihatan	1	2	3	4	5
D5	Saya mahu menguruskan kesihatan saya	1	2	3	4	5
D6	Ia adalah mudah untuk digunakan	1	2	3	4	5
D7	Untuk mendapatkan penjelasan mengenai masalah kesihatan	1	2	3	4	5
D8	Saya memiliki kebolehan untuk mendapatkan maklumat kesihatan dengan sendiri	1	2	3	4	5
D9	Saya mempunyai keupayaan untuk berbuat demikian	1	2	3	4	5

Sila kongsikan cadangan/komen anda:

Sekiranya anda berminat untuk melibatkan diri dalam bahagian lain kajian ini, sila nyatakan maklumat untuk dihubungi:

☐ E-mel: _____

- ☐ Telefon: _____
- ☐ Facebook: _____
- ☐ Lain-lain. Sila nyatakan:_____

Terima kasih. Kerjasama anda amatlah dihargai.

APPENDIX B

INTERNAL CONSISTENCY RELIABILITY

Items	AC	CR	EM	HC	HM	OHIU	PC	QC	QW	SA	SK	SS
AC1	**0.920**	0.486	0.140	0.168	0.172	0.333	0.257	0.491	0.535	0.399	0.171	0.245
AC2	**0.851**	0.463	0.110	0.097	0.086	0.244	0.203	0.460	0.475	0.301	0.036	0.159
CR1	0.478	**0.877**	0.194	0.171	0.165	0.334	0.193	0.619	0.528	0.377	0.121	0.169
CR2	0.452	**0.868**	0.261	0.238	0.227	0.417	0.220	0.615	0.563	0.384	0.175	0.170
CR3	0.496	**0.868**	0.183	0.126	0.174	0.324	0.172	0.560	0.574	0.377	0.079	0.223
CR4	0.442	**0.875**	0.200	0.163	0.216	0.341	0.198	0.585	0.659	0.377	0.091	0.205
EM1	0.090	0.182	**0.888**	0.468	0.585	0.444	0.381	0.275	0.194	0.359	0.400	0.138
EM2	0.163	0.216	**0.844**	0.385	0.528	0.439	0.335	0.274	0.234	0.307	0.327	0.164
EM3	0.117	0.229	**0.923**	0.420	0.560	0.474	0.369	0.277	0.214	0.367	0.366	0.143
EM4	0.141	0.235	**0.908**	0.452	0.569	0.463	0.381	0.303	0.227	0.341	0.350	0.222
HCN1	0.099	0.131	0.314	**0.649**	0.347	0.279	0.358	0.163	0.139	0.213	0.350	0.164
HCS2	0.074	0.150	0.466	**0.859**	0.415	0.400	0.464	0.235	0.118	0.278	0.459	0.071
HCS3	0.188	0.197	0.373	**0.866**	0.359	0.434	0.482	0.256	0.187	0.319	0.388	0.145
HM1	0.128	0.216	0.509	0.418	**0.878**	0.359	0.296	0.239	0.256	0.256	0.313	0.200
HM2	0.102	0.166	0.610	0.465	**0.892**	0.398	0.323	0.241	0.216	0.330	0.383	0.236
HM3	0.164	0.189	0.438	0.254	**0.722**	0.285	0.248	0.251	0.197	0.254	0.202	0.205
DV1	0.225	0.312	0.449	0.427	0.342	**0.832**	0.393	0.305	0.238	0.590	0.317	0.154
DV2	0.260	0.307	0.402	0.408	0.302	**0.818**	0.391	0.343	0.265	0.543	0.317	0.164
DV3	0.356	0.350	0.437	0.372	0.375	**0.847**	0.470	0.390	0.293	0.777	0.350	0.164
DV4	0.319	0.434	0.470	0.383	0.374	**0.850**	0.408	0.428	0.338	0.728	0.357	0.155
DV5	0.254	0.326	0.427	0.378	0.363	**0.835**	0.426	0.336	0.223	0.630	0.421	0.161
PC1	0.250	0.191	0.401	0.549	0.345	0.500	**0.936**	0.320	0.221	0.390	0.476	0.110
PC2	0.235	0.229	0.358	0.462	0.297	0.435	**0.914**	0.275	0.215	0.345	0.480	0.105
QC1	0.473	0.588	0.261	0.277	0.312	0.362	0.284	**0.853**	0.563	0.388	0.278	0.166
QC2	0.422	0.596	0.267	0.264	0.275	0.357	0.256	**0.865**	0.532	0.360	0.258	0.166
QC3	0.484	0.660	0.254	0.249	0.255	0.370	0.260	**0.850**	0.593	0.362	0.226	0.166
QC4	0.432	0.573	0.291	0.223	0.243	0.367	0.289	**0.883**	0.556	0.340	0.224	0.161
QC5	0.496	0.578	0.230	0.162	0.240	0.333	0.295	**0.838**	0.586	0.363	0.169	0.124
QC6	0.471	0.563	0.303	0.241	0.228	0.368	0.331	**0.877**	0.602	0.362	0.227	0.144
QC7	0.424	0.547	0.308	0.262	0.242	0.370	0.255	**0.859**	0.538	0.333	0.235	0.077
QC9	0.469	0.565	0.254	0.222	0.179	0.336	0.237	**0.817**	0.640	0.348	0.173	0.174
QW1	0.425	0.549	0.176	0.192	0.166	0.284	0.237	0.681	**0.729**	0.340	0.131	0.181
QW2	0.529	0.584	0.189	0.108	0.175	0.241	0.156	0.555	**0.845**	0.313	0.058	0.275
QW3	0.503	0.547	0.192	0.101	0.217	0.215	0.110	0.488	**0.840**	0.284	0.070	0.311

Items	AC	CR	EM	HC	HM	OHIU	PC	QC	QW	SA	SK	SS
QW4	0.451	0.478	0.142	0.067	0.182	0.208	0.172	0.464	**0.775**	0.265	0.124	0.246
QW5	0.426	0.538	0.302	0.192	0.322	0.330	0.232	0.554	**0.853**	0.299	0.169	0.297
QW6	0.468	0.501	0.173	0.202	0.228	0.240	0.203	0.453	**0.840**	0.275	0.083	0.413
QW7	0.461	0.528	0.224	0.143	0.217	0.237	0.119	0.516	**0.784**	0.283	0.059	0.317
QW8	0.455	0.574	0.167	0.171	0.212	0.305	0.264	0.553	**0.864**	0.319	0.112	0.264
SA1	0.347	0.379	0.384	0.333	0.318	0.747	0.388	0.405	0.313	**0.899**	0.356	0.132
SA2	0.319	0.408	0.346	0.299	0.301	0.654	0.308	0.350	0.327	**0.894**	0.245	0.190
SA3	0.413	0.388	0.311	0.293	0.292	0.721	0.376	0.370	0.357	**0.907**	0.298	0.142
HL1	0.035	0.098	0.236	0.384	0.227	0.252	0.304	0.207	0.060	0.187	**0.721**	-0.076
HL2	0.096	0.158	0.224	0.292	0.230	0.250	0.344	0.221	0.183	0.223	**0.683**	0.051
HL4	0.113	0.080	0.295	0.449	0.279	0.335	0.426	0.215	0.123	0.239	**0.793**	0.063
SE1	0.112	0.149	0.361	0.403	0.316	0.413	0.448	0.229	0.085	0.313	**0.863**	-0.004
SE3	0.123	0.064	0.411	0.416	0.355	0.418	0.462	0.175	0.073	0.315	**0.834**	0.155
SS2	0.229	0.201	0.192	0.161	0.291	0.197	0.137	0.181	0.350	0.178	0.083	**0.922**
SS3	0.204	0.176	0.134	0.125	0.207	0.130	0.104	0.123	0.315	0.104	0.035	**0.921**
SS4	0.207	0.220	0.178	0.128	0.193	0.179	0.076	0.158	0.298	0.171	0.037	**0.910**

Notes: AC: Accessibility; CR: Credibility; EM: Empowerment; HC: Health Concern; HM: Health Management; OHIU: Online Health Information Use; PC: Perceived Convenience; QC: Quality of Content; QW: Quality of Website Design; SA: Satisfaction; SK: Skill; SS: Social Support

APPENDIX C

EVALUATION OF ONLINE HEALTH INFORMATION RESOURCE PROTOTYPE

FACULTY OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

Dear respected participants,

Thank you for your willingness to take part in this evaluation. The objective of this evaluation is to investigate online health information use with the prototype and resources that you frequently use. Issues of trustworthiness and massive number of results are among the problems in searching for online health information. The Online Health Information Resource is a prototype that aims to provide reliable, accurate, and commercial-free health information in a single application.

The prototype functions:

1. View information from trustworthy sources
2. Search (user can filter the sources and types of info on the left side of the page)
3. Save & manage article in 'Saved Article' function (for user who are registered and logged-in)
4. Share article with family and friends through email and social media
5. View latest health-related news
6. Contact the application provider

Types of information for health condition available in the prototype:

1. Asthma
2. Diabetes
3. Heart Attack
4. Human Papillomavirus (HPV)
5. Stroke

Please follow the instructions given in each section. Data collected will be completely anonymous and for research purpose only. To ensure familiarity in using the prototype, you are able to access and use it in a period of one month and you may submit your evaluation at any time within this period. There is no restriction in the number of times you can access and use the prototype but you can only submit the evaluation just once. You may contact the researcher for any questions or assistance.

Syarifah Norfadzila Bt. Wan Aderus (sfadzila@um.edu.my)
Ph.D. Candidate
Faculty of Computer Science & Information Technology
University of Malaya, 50603 Kuala Lumpur

Part A

Please select an answer for each of the following questions

1. What is your age?

   _____

2. Highest level of education completed:
   - ☐ Primary School
   - ☐ Secondary School
   - ☐ College/University

3. The overall frequency of searching for online health information:
   - ☐ Daily
   - ☐ Weekly
   - ☐ Once a month
   - ☐ Every 2-3 months
   - ☐ 2-3 times a year
   - ☐ Other. Please specify: _____

4. I usually search for online health information using:
   - ☐ Search engines (e.g. Google, Yahoo)
   - ☐ Authority-based websites (e.g. Ministry of Health, Hospitals, MyHEALTH portal, WebMD)
   - ☐ Health-specific search engines (e.g. Google Health, Yahoo Health)
   - ☐ Online medical journal (e.g. Medline, Medscape)
   - ☐ Forums and blogs
   - ☐ Social networks (e.g. Facebook, Twitter, PatientsLikeMe)
   - ☐ YouTube
   - ☐ Other. Please specify: _____

Part B

In the following sections, please indicate your **level of agreement** based on the scale:

1-Strongly Disagree 2- Disagree 3-Neutral 4-Agree 5-Strongly Agree

Instructions:

1. Please search the selected health condition using the prototype. You can access the prototype here: http://dev.health-simplify.com.
2. Search for these information:
   a. General Information
   b. Symptoms
   c. Diagnosis and Tests
   d. Prevention and Control
   e. Treatments and Therapies
3. Examine the results that you have obtained
4. You can try to save the information that you have found or share it with others
5. Search for the latest news in health
6. Evaluate the process of health information searching using the prototype here: https://www.surveyplanet.com/54571004968d6e492b0e7ec4.

Perceived Convenience					
Easy to use	1	2	3	4	5
Easy to perform information searching	1	2	3	4	5
Easy to navigate through the content	1	2	3	4	5
Easy to manage saved articles	1	2	3	4	5
It saves me time in getting information from multiple sources at once	1	2	3	4	5
Overall, the prototype is very convenience to use	1	2	3	4	5
Skill					
I have enough skills to use the prototype	1	2	3	4	5
I am able to use the prototype without another person's assistance	1	2	3	4	5
I am able to evaluate the quality of the content	1	2	3	4	5
I feel that I am in control of what I learn using the prototype	1	2	3	4	5
I am confident with my ability to use the prototype for health information	1	2	3	4	5
Overall, minimum skill is required to use the prototype	1	2	3	4	5
Health concern					
I will use the prototype to seek health information for myself	1	2	3	4	5
I will use the prototype to seek health information for someone else (sharing information is easy using the prototype)	1	2	3	4	5
It is possible to take precaution and prevent illness using the provided information	1	2	3	4	5
The prototype provided up-to-date health information that can improve the quality of life	1	2	3	4	5
Overall, the prototype is able to help in addressing health concern	1	2	3	4	5
Empowerment					
Get current health issues/trends	1	2	3	4	5
Get good quality of health information from different sources	1	2	3	4	5
Get information on prevention	1	2	3	4	5
Get information on treatments	1	2	3	4	5
Overall, the prototype contributes to the health empowerment of the user	1	2	3	4	5
Quality of content					
Informative (provide sufficient explanation)	1	2	3	4	5
Well-organized sections (i.e. definition, symptom, treatment, prevention)	1	2	3	4	5
Use of simple and clear language	1	2	3	4	5
Current information (e.g. recent outbreaks)	1	2	3	4	5
Overall, the prototype provides high quality of content	1	2	3	4	5
Credibility					

Information from knowledgeable source (e.g. trusted organization)	1	2	3	4	5
Display legal prove (e.g. disclaimers, privacy policy, disclosures, copyright)	1	2	3	4	5
Authorship for the content (e.g. ownership, credentials, affiliation, references)	1	2	3	4	5
Display details of the source (e.g. objectives)	1	2	3	4	5
Credible links to health information resources	1	2	3	4	5
Overall, the prototype provides credible health information	1	2	3	4	5
Accessibility					
I was able to access the content without much difficulty	1	2	3	4	5
I can get to information quickly	1	2	3	4	5
It is easy to remember where to find things	1	2	3	4	5
No membership requirement in order to access information	1	2	3	4	5
Overall, it is easy to find information using the prototype	1	2	3	4	5
Satisfaction					
It is pleasant to use	1	2	3	4	5
It increase the effectiveness of health information searching	1	2	3	4	5
Using the prototype enhance my health information searching experience	1	2	3	4	5
I will continue to use the prototype	1	2	3	4	5
Overall, I am satisfied with the prototype	1	2	3	4	5

Part C

In the following sections, please indicate your **level of agreement** based on the scale:
1-Strongly Disagree 2- Disagree 3-Neutral 4-Agree 5-Strongly Agree

Instructions:

1. Please search the selected health condition using the resource that you frequently use (e.g. Google, Wikipedia, website, blog, etc.)
2. Search for these information:
    a. General Information
    b. Symptoms
    c. Diagnosis and Tests
    d. Prevention and Control
    e. Treatments and Therapies
3. Examine the results that you have obtained
4. You can try to save the information that you have found or share it with others
5. Search for the latest news in health
6. Evaluate the process of health information searching using the resource here: https://www.surveyplanet.com/54571004968d6e492b0e7ec4.

Please provide the name of online health information resource that you choose for this evaluation: _____

Perceived Convenience					
Easy to use	1	2	3	4	5
Easy to perform information searching	1	2	3	4	5
Easy to navigate through the content	1	2	3	4	5
Easy to manage saved articles	1	2	3	4	5
It saves me time in getting information from multiple sources at once	1	2	3	4	5
Overall, the chosen resource is very convenience to use	1	2	3	4	5
Skill					
I have enough skills to use the resource	1	2	3	4	5
I am able to use the resource without another person's assistance	1	2	3	4	5
I am able to evaluate the quality of the content	1	2	3	4	5
I feel that I am in control of what I learn using the resource	1	2	3	4	5
I am confident with my ability to use the resource for health information	1	2	3	4	5
Overall, minimum skill is required to use the resource	1	2	3	4	5
Health concern					
I will use the resource to seek health information for myself	1	2	3	4	5
I will use the resource to seek health information for someone else (sharing information is easy using the prototype)	1	2	3	4	5
It is possible to take precaution and prevent illness using the provided information	1	2	3	4	5
The resource provided up-to-date health information that can improve the quality of life	1	2	3	4	5
Overall, the resource is able to help in addressing health concern	1	2	3	4	5
Empowerment					
Get current health issues/trends	1	2	3	4	5
Get good quality of health information from different sources	1	2	3	4	5
Get information on prevention	1	2	3	4	5
Get information on treatments	1	2	3	4	5
Overall, the resource contributes to the health empowerment of the user	1	2	3	4	5
Quality of content					
Informative (provide sufficient explanation)	1	2	3	4	5
Well-organized sections (i.e. definition, symptom, treatment, prevention)	1	2	3	4	5
Use of simple and clear language	1	2	3	4	5
Current information (e.g. recent outbreaks)	1	2	3	4	5
Overall, the resource provides high quality of content	1	2	3	4	5
Credibility					

Information from knowledgeable source (e.g. trusted organization)	1	2	3	4	5
Display legal prove (e.g. disclaimers, privacy policy, disclosures, copyright)	1	2	3	4	5
Authorship for the content (e.g. ownership, credentials, affiliation, references)	1	2	3	4	5
Display details of the source (e.g. objectives)	1	2	3	4	5
Credible links to health information resources	1	2	3	4	5
Overall, the resource provides credible health information	1	2	3	4	5
Accessibility					
I was able to access the content without much difficulty	1	2	3	4	5
I can get to information quickly	1	2	3	4	5
It is easy to remember where to find things	1	2	3	4	5
No membership requirement in order to access information	1	2	3	4	5
Overall, it is easy to find information using the resource	1	2	3	4	5
Satisfaction					
It is pleasant to use	1	2	3	4	5
It increase the effectiveness of health information searching	1	2	3	4	5
Using the resource enhance my health information searching experience	1	2	3	4	5
I will continue to use the resource	1	2	3	4	5
Overall, I am satisfied with the resource	1	2	3	4	5

Do you have any suggestions/recommendation?

Thank you. Your contribution matters.

PENILAIAN PROTOTAIP SUMBER MAKLUMAT KESIHATAN ATAS TALIAN

FAKULTI SAINS KOMPUTER & TEKNOLOGI MAKLUMAT

Kepada peserta yang dihormati,

Terima kasih di atas kesudian untuk mengambil bahagian di dalam penilaian ini. Objektif penilaian ini adalah untuk menilai prototaip dan sumber yang kerap digunakan bagi pencarian maklumat berkenaan kesihatan atas talian. Isu kebolehpercayaan dan jumlah laman yang tinggi merupakan masalah utama di dalam pencarian berkenaan maklumat kesihatan atas talian ini. Prototaip "Online Health Information Resource" ini bertujuan untuk membolehkan penyampaian maklumat yang jitu, tepat, dan bebas iklan dengan hanya menggunakan satu perisian sahaja.

Fungsi prototaip ini adalah:

1. Perolehan maklumat daripada sumber yang boleh dipercayai
2. Mencari (pengguna boleh menapis sumber dan jenis maklumat di bahagian kiri laman)
3. Menyimpan & mengurus artikel menggunakan fungsi 'Saved Article' (hanya bagi pengguna berdaftar dan telah log masuk)
4. Perkongsian artikel dengan keluarga dan rakan melalui e-mail dan media sosial
5. Melihat berita terkini berkenaan kesihatan
6. Menghubungi terus pentadbir laman

Jenis maklumat kondisi kesihatan yang terdapat di dalam prototaip ini adalah:

1. Asma
2. Diabetes
3. Sakit jantung
4. *Human Papillomavirus* (HPV)
5. Strok

Sila ikut arahan yang diberikan di setiap bahagian. Data yang dikumpul adalah sulit dan hanya akan diguna bagi tujuan penyelidikan sahaja. Peserta diberikan tempoh sebulan untuk mengguna dan membiasakan diri dengan prototaip ini. Penilaian kemudian boleh dilakukan sepanjang tempoh tersebut. Tiada had bilangan log masuk dan penggunaan prototaip ini, namun hanya satu penilaian boleh dibuat oleh setiap peserta. Sebarang pertanyaan boleh diajukan kepada penyelidik berikut.

Syarifah Norfadzila Bt. Wan Aderus (sfadzila@um.edu.my)
Calon Doktor Falsafah
Fakulti Sains Komputer & Teknologi Maklumat
University Malaya, 50603 Kuala Lumpur

Bahagian A
Sila nyatakan/pilih jawapan bagi setiap soalan berikut

1. Berapakah umur anda?
   _____

2. Tahap pengajian tertinggi:
   - ☐ Sekolah rendah
   - ☐ Sekolah menengah
   - ☐ Kolej / Universiti

3. Purata kekerapan pencarian maklumat kesihatan atas talian:
   - ☐ Setiap hari
   - ☐ Setiap minggu
   - ☐ Sekali setahun
   - ☐ Setiap 2-3 bulan
   - ☐ 2-3 kali setahun
   - ☐ Lain-lain. Sila nyatakan: _____

4. Saya kebiasaannya mencari maklumat kesihatan atas talian menggunakan:
   - ☐ Enjin pencarian (e.g. Google, Yahoo)
   - ☐ Laman rasmi (e.g. Kementerian Keshatan, Hospital, portal MyHEALTH, WebMD)
   - ☐ Laman pencarian spesifik berkenaan kesihatan (e.g. Google Health, Yahoo Health)
   - ☐ Jurnal kesihatan atas talian (e.g. Medline, Medscape)
   - ☐ Forum dan blog
   - ☐ Laman sosial (e.g. Facebook, Twitter, PatientsLikeMe)
   - ☐ YouTube
   - ☐ Lain-lain. Sila nyatakan: _____

Bahagian B
Sila nyatakan pendapat anda dengan pernyataan yang diberi berdasarkan skala berikut:
1-Sangat tidak bersetuju 2- Tidak bersetuju 3-Neutral
4-Setuju 5-Sangat setuju

Arahan:

7. Sila lakukan pencarian berdasarkan kondisi kesihatan menggunakan prototaip di alamat berikut: http://dev.health-simplify.com.
8. Buat pencarian berdasarkan maklumat berikut:
   a. Maklumat umum
   b. Simptom
   c. Diagnosis dan Ujian
   d. Pencegahan dan Kawalan
   e. Rawatan dan Terapi
9. Sila teliti hasil pencarian yang dilakukan
10. Anda boleh mencuba menyimpan maklumat yang diperolehi atau berkongsi dengan pihak lain
11. Lakukan pencarian tentang isu terkini berkaitan kesihatan
12. Nilai proses pencarian maklumat menggunkan protaip ini di laman berikut: https://www.surveyplanet.com/54571004968d6e492b0e7ec4.

Tahap kesenangan					
Mudah digunakan	1	2	3	4	5
Mudah dalam melakukan pencarian maklumat	1	2	3	4	5
Mudah bagi navigasi kandungan	1	2	3	4	5
Mudah untuk menguruskan penyimpanan maklumat	1	2	3	4	5
Memudahkan saya mendapatkan maklumat dari pelbagai sumber secara serentak	1	2	3	4	5
Secara keseluruhannya, prototaip amat mudah digunakan	1	2	3	4	5
Kemahiran					
Saya mempunyai kemahiran mencukupi bagi mengguna prototaip	1	2	3	4	5
Saya mampu menggunakan prototaip tanpa bantuan	1	2	3	4	5
Saya mampu menilai kualiti kandungan maklumat	1	2	3	4	5
Saya mampu mengawal apa yang dipelajari menggunakan prototaip	1	2	3	4	5
Saya yakin dengan kebolehan saya menggunakan prototaip	1	2	3	4	5
Secara keseluruhannya, penggunaan prototaip hanya memerlukan kemahiran minima	1	2	3	4	5
Isu kesihatan					
Saya menggunakan prototaip bagi pencarian isu kesihatan untuk diri sendiri	1	2	3	4	5
Saya akan menggunakan prototaip bagi pencaraian isu kesihatan untuk orang lain (perkongsian maklumat adalah mudah menggunakan prototaip)	1	2	3	4	5
Pencegahan penyakit boleh dilakukan menggunakan maklumat yang diperolehi	1	2	3	4	5
Prototaip memberikan maklumat terkini yang boleh meningkatkan kualiti hidup	1	2	3	4	5
Secara keseluruhannya, prototaip membantu menjawab isu kesihatan	1	2	3	4	5
Memperkasakan maklumat					
Mendapatkan maklumat terkini berkenaan isu kesihatan	1	2	3	4	5
Mendapatkan maklumat kesihatan yang berkualiti dari pelbagai sumber	1	2	3	4	5
Medapatkan maklumat berkenaan pencegahan	1	2	3	4	5
Mendapatkan maklumat berkenaan rawatan	1	2	3	4	5
Secara keseluruhannya, prototaip menyumbang kepada memperkasakan maklumat kesihatan kepada pengguna	1	2	3	4	5
Kualiti kandungan maklumat					
Berinformasi (memberikan penjelasan mencukupi)	1	2	3	4	5
Isi kandungan teratur (i.e. definisi, simptom, rawatan, pencegahan)	1	2	3	4	5
Penggunaan bahasa yang ringkas dan jelas	1	2	3	4	5
Maklumat terkini (e.g. penyakit berjangkit terkini)	1	2	3	4	5
Secara keseluruhannya, prototaip memberikan isi kandungan yang berkualiti	1	2	3	4	5
Kredibiliti					

Maklumat daripada sumber berpengatahuan (e.g. organisasi yang boleh dipercayai)	1	2	3	4	5
Meletakkan pernyataan rasmi (e.g. notis penafian, polisi privasi, pendedahan, hakcipta)	1	2	3	4	5
Authoriti kandungan (e.g. hakmilik, kelayakan, hubungan organisasi, rujukan)	1	2	3	4	5
Menunjukkan maklumat sumber (e.g. objektif)	1	2	3	4	5
Pautan kepada sumber yang boleh dipercayai	1	2	3	4	5
Secara keseluruhannya, prototaip memberikan maklumat yang boleh dipercayai	1	2	3	4	5
Aksesibiliti					
Saya boleh mencapai maklumat dengan mudah	1	2	3	4	5
Saya boleh mencapai maklumat dengan cepat	1	2	3	4	5
Adalah mudah untuk mengingati di mana untuk memperolehi maklumat	1	2	3	4	5
Tiada keahlian diperlukan bagi akses maklumat	1	2	3	4	5
Secara keseluruhannya, adalah amat mudah untuk mencari maklumat menggunakan prototaip	1	2	3	4	5
Kepuasan					
Pengalaman menggunakan prototaip amat menyenangkan	1	2	3	4	5
Prototaip meningkatkan pencarian informasi kesihatan secara efektif	1	2	3	4	5
Prototaip menambahkan pengalaman dalam pencarian maklumat kesihatan	1	2	3	4	5
Saya akan terus menggunakan prototaip ini	1	2	3	4	5
Secara keseluruhannya, saya amat berpuas hati dengan sumber digunakan	1	2	3	4	5

Adakah anda mempunyai sebarang komen / cadangan?

Terima kasih. Kerjasama anda amatlah dihargai.

APPENDIX D

ANALYSIS OF OHIR PROTOTYPE EVALUATION

Constructs	Mean	Std. Deviation
Convenience in using the prototype		
Easy to use	4.50	0.548
Easy to perform information searching	4.50	0.548
Easy to navigate through the content	4.67	0.516
Easy to manage saved articles	4.00	1.095
It saves me time in getting information from multiple sources at once	4.17	0.983
Overall, the prototype is very convenience to use	4.33	0.816
Convenience in using other resource		
Easy to use	4.33	1.211
Easy to perform information searching	4.33	0.816
Easy to navigate through the content	3.17	1.835
Easy to manage saved articles	3.17	1.169
It saves me time in getting information from multiple sources at once	4.00	0.894
Overall, the chosen resource is very convenience to use	4.17	0.753
Skill in using the prototype		
I have enough skills to use the prototype	3.33	1.366
I am able to use the prototype without another person's assistance	4.17	0.753
I am able to evaluate the quality of the content	3.83	0.753
I feel that I am in control of what I learn using the prototype	3.83	0.983
I am confident with my ability to use the prototype for health information	3.83	0.983
Overall, minimum skill is required to use the prototype	3.83	0.753
Skill in using other resource		
I have enough skills to use the resource	4.33	0.816
I am able to use the resource without another person's assistance	4.17	1.169
I am able to evaluate the quality of the content	3.17	0.753
I feel that I am in control of what I learn using the resource	4.17	0.753
I am confident with my ability to use the resource for health information	4.33	0.516
Overall, minimum skill is required to use the resource	4.00	0.632
Health concern in using the prototype		
I will use the prototype to seek health information for myself	3.83	0.983
I will use the prototype to seek health information for someone else (sharing information is easy using the prototype)	3.67	1.211

Constructs	Mean	Std. Deviation
It is possible to take precaution and prevent illness using the provided information	4.17	0.753
The prototype provided up-to-date health information that can improve the quality of life	4.00	0.894
Overall, the prototype is able to help in addressing health concern	4.17	0.753
Health concern in using other resource		
I will use the resource to seek health information for myself	4.50	0.548
I will use the resource to seek health information for someone else (sharing information is easy using the prototype)	4.17	0.753
It is possible to take precaution and prevent illness using the provided information	4.33	0.816
The resource provided up-to-date health information that can improve the quality of life	4.50	0.837
Overall, the resource is able to help in addressing health concern	4.50	0.837
Empowerment in using the prototype		
Get current health issues/trends	3.83	1.169
Get good quality of health information from different sources	4.33	0.816
Get information on prevention	4.33	0.816
Get information on treatments	4.33	0.816
Overall, the prototype contributes to the health empowerment of the user	4.33	0.816
Empowerment in using other resource		
Get current health issues/trends	2.83	1.169
Get good quality of health information from different sources	3.83	0.753
Get information on prevention	3.83	0.408
Get information on treatments	4.00	1.095
Overall, the resource contributes to the health empowerment of the user	3.83	0.408
Quality of prototype content		
Informative (provide sufficient explanation)	4.67	0.516
Well-organized sections (i.e. definition, symptom, treatment, prevention)	4.50	0.548
Use of simple and clear language	4.00	0.894
Current information (e.g. recent outbreaks)	3.67	1.506
Overall, the prototype provides high quality of content	4.17	0.753
Quality of other resource content		
Informative (provide sufficient explanation)	4.00	0.894
Well-organized sections (i.e. definition, symptom, treatment, prevention)	4.33	0.816
Use of simple and clear language	3.67	1.033
Current information (e.g. recent outbreaks)	4.17	0.753

Constructs	Mean	Std. Deviation
Overall, the resource provides high quality of content	3.83	0.753
Credibility of prototype content		
Information from knowledgeable source (e.g. trusted organization)	4.33	0.816
Display legal prove (e.g. disclaimers, privacy policy, disclosures, copyright)	4.00	0.894
Authorship for the content (e.g. ownership, credentials, affiliation, references)	3.83	0.753
Display details of the source (e.g. objectives)	4.33	0.816
Credible links to health information resources	3.50	1.049
Overall, the prototype provides credible health information	4.00	0.632
Credibility of other resource content		
Information from knowledgeable source (e.g. trusted organization)	3.83	0.408
Display legal prove (e.g. disclaimers, privacy policy, disclosures, copyright)	3.67	0.516
Authorship for the content (e.g. ownership, credentials, affiliation, references)	3.67	0.516
Display details of the source (e.g. objectives)	4.00	0.632
Credible links to health information resources	4.17	0.408
Overall, the resource provides credible health information	4.17	0.408
Accessibility of the prototype		
I was able to access the content without much difficulty	4.00	1.095
I can get to information quickly	4.17	0.753
It is easy to remember where to find things	4.17	0.753
No membership requirement in order to access information	4.17	0.753
Overall, it is easy to find information using the prototype	4.17	0.753
Accessibility of other resource		
I was able to access the content without much difficulty	3.50	1.378
I can get to information quickly	3.50	1.049
It is easy to remember where to find things	3.33	1.033
No membership requirement in order to access information	3.83	0.753
Overall, it is easy to find information using the resource	3.83	0.753
Satisfaction with the prototype		
It is pleasant to use	4.00	0.894
It increase the effectiveness of health information searching	4.00	0.894
Using the prototype enhance my health information searching experience	3.67	1.211
I would be likely to use the fully developed application of this prototype	3.50	1.643
Overall, I am satisfied with this prototype	3.33	1.366
Satisfaction with other resource		

Constructs	Mean	Std. Deviation
It is pleasant to use	3.33	1.366
It increase the effectiveness of health information searching	3.33	1.366
Using the resource enhance my health information searching experience	4.00	0.894
I will continue to use the resource	4.00	0.894
Overall, I am satisfied with the resource	4.00	0.894

LIST OF PUBLICATIONS

1. Norfadzila, S.W.A., Balakrishnan, V., A. Abrizah (2012). The Conceptualization of Integrated Consumer Health Informatics Utilization Framework. *International Conference on Information and Knowledge Technology*, vol. 23, pp 106 - 110 (SCOPUS-Cited Publication).

2. Syarifah Norfadzila & Vimala Balakrishnan. Understanding the Influence of Personal Factors and Online Health Information Characteristics on Online Health Information Use. *International Journal of Medical Informatics*. Status: Under review, submitted-February 2017 (ISI Cited Publication).

3. Syarifah Norfadzila & Vimala Balakrishnan. Modeling Predictive Factors Influencing Online Health Information Use. *Health Communication*. Status: Under review, submitted-April 2017 (ISI Cited Publication).