

A MODEL FOR ENHANCING PERFORMANCE IN USING SOCIAL
NETWORK SITES FOR BREAST CANCER PATIENTS

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TO MY BELOVED HUSBAND AND PARENTS

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ABSTRACT

Social network communities that promote information about cancer are able to develop an interactive environment where there are virtual relationships among cancer patients. The current research into the assessment of cancer patients' performance in using Social Network Sites (SNS) continues to be limited, despite the potential of SNS as a platform for providing cancer information. Most of the studies are descriptive and there is still lack of using theories for studying the impact of SNS on cancer patients. To investigate the factors that influence the performance of cancer patients in using SNS, this study proposes a research model by integrating Social Cognitive Theory (SCT) and Task-Technology Fit (TTF) theory. This research applied a quantitative approach using survey method. Based on purposive sampling, questionnaires were distributed to 178 Breast Cancer (BC) patients in two hospitals and four cancer support groups in Peninsular Malaysia. Data were analysed using Smart PLS 2.0 M3 and SPSS Version 16. Results indicated that Self-Efficacy, Social Support, Negative Affect and Positive Affect, Outcome Expectation, Task Characteristics and Technology Characteristics are significant factors that influence on the performance of cancer patients in using SNS. Meanwhile, Social Support and Self-Efficacy have significant negative relationships with Negative Affect and significant positive relationships with Positive Affect. In addition, this study found significant differences between the different age, race/ethnic, education, and employment status with respect to performance in using SNS. Finally, this study provides recommendations to online cancer support groups to assist them in providing better support through SNS. Mainly, online support groups should support cancer patients by providing them Social Support and assist in increasing their Self-Efficacy in using SNS.

ABSTRAK

Komuniti dalam talian yang berkongsi maklumat tentang kanser dapat mewujudkan suasana interaktif serta hubungan maya antara pesakit-pesakit kanser. Penyelidikan terkini bagi menilai prestasi pesakit kanser dalam menggunakan SNS dilihat masih terhad walaupun Laman Jaringan Sosial (SNS) berpotensi sebagai platform bagi menyalurkan maklumat berkaitan kanser. Kebanyakan kajian adalah bersifat deskriptif dan kurang melibatkan teori dalam mengkaji kesan SNS terhadap pesakit kanser. Bagi mengkaji faktor yang mempengaruhi prestasi pesakit kanser dalam menggunakan SNS, kajian ini mencadangkan satu model kajian yang menyatukan Teori Kognitif Sosial (SCT) dan Teori Padanan Tugas–Teknologi (TTF). Kajian ini melibatkan pendekatan kuantitatif dengan menggunakan kaedah tinjauan. Berdasarkan pensampelan bertujuan, borang soal selidik diagihkan kepada 178 pesakit Kanser Payudara (BC) di dua buah hospital dan empat buah kumpulan sokongan kanser di Semenanjung Malaysia. Data dianalisis menggunakan *Smart PLS 2.0 M3* dan SPSS Versi 20. Keputusan menunjukkan bahawa Kecekapan Diri, Sokongan Sosial, Kesan Negatif dan Kesan Positif, Jangkaan Hasil, Ciri-ciri Tugas, serta Ciri-ciri Teknologi merupakan faktor-faktor signifikan yang mempengaruhi prestasi pesakit kanser dalam menggunakan SNS. Sokongan Sosial dan Kecekapan Diri mempunyai hubungan negatif yang signifikan dengan Kesan Negatif dan hubungan positif yang signifikan dengan Kesan Positif. Kajian ini juga mendapati terdapat perbezaan signifikan antara faktor umur, bangsa/etnik, pendidikan, dan status pekerjaan, berkaitan prestasi mereka dalam menggunakan SNS. Akhir sekali, kajian ini mengutarakan beberapa cadangan kepada kumpulan sokongan kanser atas talian agar pesakit kanser diberi sokongan yang lebih baik melalui SNS. Lebih utama, sokongan kumpulan atas talian seharusnya boleh menyokong pesakit kanser dengan menyediakan Sokongan Sosial dan membantu di dalam menambahkan Kecekapan Diri di dalam penggunaan SNS.

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LIST OF ABBREVIATIONS

ANOVA	-	Analysis of Variance
AVE	-	Average Variance Extracted
BC	-	Breast Cancer
CR	-	Composite Reliability
DOI	-	Diffusion of Innovation
EHR	-	Electronic Health Record
EMR	-	Electronic Medical Record
EPHR	-	Electronic Personal Health Record
HI	-	Health Informatics
HIS	-	Health Information System
HKL	-	Hospital Kuala Lumpur
IS	-	Information Systems
MDC	-	Multi Disciplinary Care
MMCH	-	Mount Miriam Cancer Hospital
NCSM	-	National Cancer Society of Malaysia
SCT	-	Social Cognitive Theory
SNS	-	Social Network Sites
SNT	-	Social Network Theory
TTF	-	Task Technology Fit
TAM	-	Technology Acceptance Model
TPB	-	Theory of Planned Behavior
TRA	-	Theory of Reasoned Action
UTAUT	-	Unified Theory of Acceptance and Use of Technology

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Health Informatics (HI) has been concerned with the use of technology for the optimal use of health related information for problem solving and decision making to improve healthcare outcomes (Hovenga *et al.*, 2010). The discipline of Information Systems (IS) consists of the study of both the technical and social perspectives of the use of information technology for problem solving. The discipline of HI explores the value of applying IS theories and methodologies to improve systems' success (Lorenzi *et al.*, 1997).

One of the main health dilemmas afflicting Malaysia is cancer (Muhamad *et al.*, 2011). The incidence of cancer is 30000 yearly and Breast Cancer (BC) is the most common cancer (National Cancer Registry, 2007). Now days, patients and their families often cite difficulties such as lack of information, insufficient psychosocial support, and uncoordinated care (Clauser *et al.*, 2012). On the other hand, social network revolutionizes the way individuals collaborate, communicate, and identify information that is useful for them (Eysenbach, 2008).

There are some studies that described improvements that Social Network Sites (SNS) could offer to healthcare (Bacigalupe, 2011). It can serve as key health communication channels to provide a location for online dialogue and encourage communities and individuals to interact by providing information related to disease treatment, and survivorship (Luo and Smith, 2011; Ramanadhan *et al.*, 2013; Koskan *et al.*, 2014). Therefore, research should be focused on explaining best practices and recommendations that may help speed up effective usage of SNS as a support of BC patients (Van de Belt *et al.*, 2012).

1.2 Problem Background

Patients in the 21st century are not like patients in the past. Many of them like to obtain new and additional information about their illness (Rodgers and Chen, 2005; López-Gómez *et al.*, 2012). There is also an initiative to provide cancer support online such as KanPortal in Malaysia which is conceptually organized to provide online information on cancer. However, this website did not allow two way interactions (Abdullah, 2011). The increasing interest in social networks have made more people inquire about health-related information via virtual environments, exchange experiences, seek out advice, and support from online peer networks (Demiris, 2006).

SNS are the means of sharing information that can help patients obtain cancer related information in order to cope with their illness. Women with BC often face major emotional challenges and exchange social support with peer patients in online support groups (Yoo *et al.*, 2014). One of the most popular and perhaps most successful online communities is Facebook. Just over 5 years since its launch, Facebook became the second most visited website in the world, with over 500 million active users worldwide (Bender *et al.*, 2011). Searching on Facebook revealed over 600 support groups generally as the means to keep members updated on their treatment and at the same time to get supportive feedback (Grajales *et al.*,

2014). For Instance, searching the key term of “Breast Cancer” on Facebook revealed many BC support groups such as I HAD CANCER, Breast Cancer Survivors & Warriors Group.

Luo and Smith (2011) stated that the social networking phenomenon is providing opportunity for patients, physicians, health providers and other stakeholders share experiences and information in every health context effectively from disease to recovery and treatment. Loader *et al.* (2002) distinguished that informational support can be provided in online communities by virtual relationships. Few studies have considered the role of SNS in disseminating health information despite their potential to deliver health messages to large audiences for receiving health information (Scanfeld *et al.*, 2010; Uhrig *et al.*, 2010; Neiger *et al.*, 2012).

Since using SNS seems to be significant for individuals with cancer; there is a need for conducting more research to understand factors that can potentially affect cancer patients’ performance in using SNS. Early research (1996–2007) was mainly descriptive studies of online discussion forums. Later, researchers began analyzing SNS; therefore, future research should determine how SNS can influence cancer patients’ behaviour (Koskan *et al.*, 2014). Impact of SNS on users can be estimated through their performance (Cao *et al.*, 2014). There is still a lack of studies consider the impact of participating in BC Facebook groups (Bender, Jimenez-Marroquin and Jadad, 2011).

SNS have attracted general population in middle- income and high-income countries. However, in medicine and healthcare, a large number of stakeholders are unaware of SNS’s relevance and the potential application (Grajales *et al.*, 2014). Addressing the needs of this growing population has been recognized as supportive care’s new challenge (Surbone and Peccatori, 2006; Alfano and Rowland, 2006). cancer support groups should embrace SNS that they may contribute to quality improvements in healthcare. Active use of SNS by healthcare institutions could also

speed up information and communication provision to patients and their families, thus increasing quality even more (Van de Belt *et al.*, 2010; Van de Belt *et al.*, 2012). However, there is a lack of recommendations for online support groups to enhance cancer patients' performance in using SNS. In addition, exploring the demographic trends of SNS usage remains a key health communication priority to be sure that health communicators leverage these dissemination channels more effectively (Chou *et al.*, 2009).

According to Bowling (1997), measuring social network and support is consisted of many difficulties, as most measures have not been fully tested for reliability and validity, but need to be tested. Meanwhile, Moorhead *et al.* (2013) stated that the majority of research in SNS for healthcare mainly included limited methodologies and mainly are descriptive and exploratory in nature. For instance, in a descriptive study by Bender *et al.* (2011) characterized the purpose, use, and creators of Facebook groups related to BC.

Applying theories are useful because they provide a framework to help identify the determinants of successful intervention. There are many different IS theories in SNS research such as Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), IS Success Model, Unified Theory of Acceptance and Use of Technology (UTAUT), Social Network Theory (SNT), Social Cognitive Theory (SCT) and Task Technology Fit (TTF). However, Koskan *et al.* (2014) have done a systematic literature review on SNS in cancer related research and the results show that the usage of theories is still lacking.

Most of the research considers the effects of Social Support on cancer patients' behavior in online support groups (Shaw *et al.*, 2000; Fogel *et al.*, 2002; Nambisan, 2011; Setoyama, Yamazaki and Namayama, 2011; Han *et al.*, 2012; McLaughlin *et al.*, 2012; YLI-UOTIL, Rantanen and Suominen, 2014). There is still a lack of a comprehensive model regarding cancer patients' performance in using SNS especially those guided by IS theories. Shaw *et al.* (2008) investigated only the

social-cognitive aspects such as emotion, Self-Efficacy, Social Support of using an online cancer communication system.

The study identified Task and Technology Characteristics should fit to have the significant effect on cancer patients' performance in using SNS compared to previous studies that highlighted only Self-Efficacy, Outcome Expectation, Social Support effects on human behavior (Liaw, 2002; Nahm *et al.*, 2010; Koskan *et al.*, 2014). The literature shows that large amounts of research rarely included situational factor such as Task Characteristics (Abugabah *et al.*, 2009) and the research mainly focused on Technology Characteristics (Thompson *et al.*, 2007; Holden, 2010 ; Holden, 2011; Whittaker *et al.*, 2011; Logue and Effken, 2013; Tsai, 2014; Weeger and Gewald, 2014). Moreover, a limited number of studies have focused on emotional factors (Beaudry and Pinsonneault, 2010).

1.3 Problem Statement

Cancer related social network communities have the potential to develop an interactive environment where virtual relationships among cancer patients can be made. SNS have enabled greater accessibility and faster interaction around health issues such as validation of experience, seeking or sharing information and validation of advice, treatment and information obtained (Scanfield *et al.*, 2010).

In view of the growing presence of technology, it becomes essential to explore performance in the context of IS (Bravo *et al.*, 2014). Interestingly, none of previous studies have provided a set of the most prominent factors that affect cancer patients' performance in using SNS, but some of them investigated some of the factors separately. Most studies on SNS for cancer patients are descriptive and studies on cancer patients' behavior in SNS should be explored (Koskan *et al.*, 2014). The effects of both individual and environmental factors were assessed in this study.

The existence of SNS effect on health provides a strong theoretical and practical justification for the field of Health Information System (HIS). Farmer *et al.* (2009) stated that recent studies indicate Facebook groups are used for health purposes. However, little is known about the impact of SNS on BC patients and their performance in using SNS. The need for further investigation about these factors that could affect cancer patients' performance is extremely valuable, for both practitioners and academics, which may help online cancer support groups to obtain a more comprehensive view about the way SNS affect the performance of cancer patients in using SNS.

1.4 Research Questions

This study investigated the factors that influence cancer patients' performance in using SNS. The main research question for this study was:

How to enhance cancer patients' performance in using SNS?

Subsequently the following three research questions were developed for this study:

- i) What are the factors that influence cancer patients' performance in using SNS?
- ii) How to develop and validate a model for cancer patients' performance in using SNS?
- iii) What recommendations can be made to online support groups to enhance cancer patients' performance in using SNS?

1.5 Objectives

This research study answers the following research objectives:

- i. To investigate the factors that influence to cancer patients' performance in using SNS.
- ii. To develop and validate a model for cancer patients' performance in using SNS.
- iii. To provide recommendations to online support groups to enhance cancer patients' performance in using SNS.

1.6 Scope of the Research

One of the most common cancers among women and a serious disease in Malaysian society is BC (Muhamad *et al.*, 2011). There are many types of cancer such as Lung cancer, BC, Prostate cancer, Colorectal cancer. However, Facebook groups have become a popular tool for BC patients' support attracting over one million users (Bender *et al.*, 2011). Meanwhile, this study investigates the individuals' performance in using SNS and do not consider the system performance.

The study was conducted in two hospitals which were Mount Miriam Cancer Hospital and Hospital Kuala Lumpur and four cancer support groups which were National Cancer Society Malaysia, Johor Bahru Cancer Support Group, Kluang Cancer Support Group and Penang Breast Care Society.

1.7 Significance of the Research

Since SNS seems to be significant for the individual with cancer and there is a need for more research to understand how SNS support effects on cancer patients. The findings of this research study are valuable because provide information on health related SNS as a support of BC patients in Malaysia and how SNS could provide support for cancer patients since the annual incidence of cancer is 3000 in Malaysia. Therefore, this research provides the recommendations for online cancer support groups to enhance cancer patients' performance in using SNS.

Finding of the study presented the factors that are related to performance of cancer patients in using SNS which will enable healthcare providers to generate ideas on how an effective SNS intervention for cancer patients can be conducted. The findings have resulted in practical and theoretical contributions where the model is used as a tool for online cancer support groups to gain insight into factors that affect cancer patients' performance in using SNS. In addition, to meet patients' needs may result in cost savings, patient empowerment and activation and these are the ways for achieving patient-centred care. The significance of this research are the developed theoretical model which is expected to find the factors that affect cancer patients' performance in using SNS and Providing recommendations to online cancer support groups to enhance cancer patients' performance in using SNS.

1.8 Thesis Structure

The research consists of six chapters, and its framework is as follows:

Chapter 1 presents a brief introduction to the study and describe the research problem. It then highlights the objectives of the study, the significance and scope. The structure of the thesis is explained at the end of the chapter.

Chapter 2 reviews the literature on the definition of Web 2.0, SNS as a central to Health 2.0, the benefits of SNS in healthcare, SNS in healthcare, patient 2.0 empowerment and informational support through SNS. The relevant theories are considered and the constructs for the formation of research model is defined.

Chapter 3 presents the research methodology and design. The chapter discusses the research paradigm that is particularly relevant to this study. The operational research framework that details the activities and steps is also developed.

Chapter 4 presents the results of the proposed conceptual model and the pilot study. A preliminary study is conducted to understand and confirm the constructs that affect cancer patients' performance in using SNS. The research hypotheses are also developed. Last but not the least, a pilot survey that is conducted to develop the relevant instrument is described.

Chapter 5 presents the main data analysis related to differences among demographic groups in relation to performance and assessing the proposed model by Smart PLS 2.0 M3. At last, the recommendations are provided for online cancer support groups to enhance cancer patients' performance in using SNS.

Chapter 6 highlights the key findings that have emerged from this study and concludes with a discussion of the implications of the research outcomes and contributions, the limitations of the study, and the future research.

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