

Influence of motivational factors on utilisation of Internet health information resources by resident doctors in Nigeria

Internet health
information
resources

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Received 30 August 2014
Revised 10 September 2014
Accepted 27 September 2014

Abstract

Purpose – This study aims to determine the influence of motivational factors: perceived ease of use (PEU), perceived enjoyment (PEJ) and perceived usefulness (PU) on utilisation of Internet health information resources among resident doctors in tertiary health-care institutions in Nigeria. The Internet has become a major source of health information for practitioners and the general public. Despite the availability of health information resources on the Internet, some resources are underutilised. There are numerous studies on Internet use among health-care workers; however, there is a dearth of information on motivational factors influencing utilisation of Internet health information resources among resident doctors in Nigeria.

Design/methodology/approach – A descriptive survey design was used. Total enumeration technique was adopted to cover 1,280 resident doctors in 13 tertiary health-care institutions in southwestern Nigeria. A validated, self-administered questionnaire was used for data collection. The questionnaire has four sections covering the demographic profile of the respondents, PEU, PEJ and PU. Four hypotheses were tested at the $p < 0.01$ level of significance. Data were analyzed using descriptive statistics, Pearson product-moment correlation and multiple regression analysis.

Findings – There were more males (69.0 per cent) than females (31 per cent); respondents mean age was 34 years. The result revealed that PEU ($r = 0.181, p < 0.01$), PEJ ($r = 0.166, p < 0.01$) and PU ($r = 0.121, p < 0.01$) have significant relationship with utilisation of Internet health information resources by the respondents. Also, PEU, PEJ and PU collectively ($F = 15.366, df = 3; 897, p < 0.01$) have significant influence on utilisation of Internet health information resources of the respondents. Individually, PEU ($B = 0.864, df = 897, t = 3.90, p < 0.01$) and PEJ ($B = 0.349, df = 897, t = 3.060, p [t] 0.01$) were found to have significant influence on utilisation while PU ($B = 0.232, df = 897, t = 1.328, p > 0.01$) does not significantly influence the utilisation of Internet health information resource of the respondents.

Research limitations/implications – One major implication of this study is that system designers and web content developers should design programs and websites that are compatible with the user's abilities. Medical librarians have a role to play in providing quality health content that is easy to navigate and pleasurable to use. Both the institutions and the government have a role to play in



The Electronic Library
Vol. 33 No. 1, 2015
pp. 103-119

© Emerald Group Publishing Limited
0264-0473
DOI 10.1108/EL-12-2012-0159

The authors thank all the resident doctors who participated in this study and the University of Ibadan for award of the Senate Research Grant No: SRG/COM/ML/2010/1^A

providing information and communication technology facilities to enable doctors access relevant health information resources easily.

Practical implications – Introduction of information literacy training in the residency programme or inclusion as a component of the continuing professional development will enable resident doctors to know relevant online searching tools and search techniques for accessing health information resources which will be useful to their work. This will in turn increase their PU of Internet resources. Health sciences librarians (medical librarians) in the various institutions/centres have a role to play in training resident doctors on how to access, retrieve and evaluate online health information. Librarians should also train resident doctors on how to search evidence-based Medicine resources such as the Cochrane Library and PubMed Clinical Queries and Critical Appraisal of the medical literature to make informed decision in the management of their patients and for research purposes. They should be trained on how to organise bibliographic references using reference manager tools such as Endnote, Zotero or Mendeley.

Social implications – The social implication of this findings is that systems that are easy to use should be designed, so that doctors will be able to access relevant information for research and patient care for better health outcomes. The easier and enjoyable the system is to use, the more resident doctors will access and use health information resources to improve their service and save more lives.

Originality/value – This study examined three motivational factors (PEU, PEJ and PU) that influence the utilisation of Internet health information resources by resident doctors in tertiary health-care institutions in Nigeria. The result revealed that collectively PEU, PEJ and PU have significant relationship with the utilisation of Internet health information resources, but PEU and PEJ are the main drivers of use of Internet health information resources among the resident doctors studied. This study adds to the literature of motivational factors influencing utilisation of Internet health information resources by resident doctors in southwestern Nigeria. This paper is original because, to the best of our knowledge, there is no other study on motivational factors influencing Internet use among resident doctors in Nigeria.

Keywords Information retrieval, Internet, Electronic resources, Information and communication technologies, Information dissemination, Online retrieval

Paper type Research paper

Introduction

The Internet has become the world's biggest library where clinical and scientific information can be retrieved within minutes. It has the capacity to process, store, transmit and disseminate information across geographical boundaries. Use of the Internet by health-care practitioners has grown in recent years and has made an impact in research, training and patient care (Ajuwon, 2006). It enables medical doctors to collaborate, interact and communicate with their colleagues across the globe (Manhas, 2008). In addition, health-care professionals use the Internet to access medical records and literature. The Internet provides appropriate tools for continuing medical education and remote patient care through telemedicine facilities (Joose *et al.*, 2006).

Previous studies which addressed information-seeking and use among health-care practitioners revealed that they used both formal and informal sources of information (Andrews *et al.*, 2005; Nwagwu and Oshiname, 2009; Haines *et al.*, 2010). Medical doctors usually prefer communication with their colleagues as a source of clinical information, as well as print sources such as books and journal articles to answer questions that arise in their daily practice (Naidoo *et al.*, 2010; Kosteniuk *et al.*, 2013).

Health-care practitioners are using the Internet for searching current information to update their knowledge. They recognise the Internet's potential ability to provide

quick access to high-quality and trustworthy health information (Feightner *et al.*, 2012). Recent studies (Idowu *et al.*, 2008; Collste *et al.*, 2013) showed that the rate of adoption of information and communication technology (ICT) has increased in developed countries with the introduction and use of electronic health records and other patient management systems. However, in sub-Saharan Africa, the rate of adoption and utilisation of ICT has been slow due to power outages, resistance to new technologies, government attitude towards ICT, cost of ICT facilities, inadequate telecommunication infrastructure, lack of maintenance culture and high cost of Internet access, among others (Asangansi *et al.*, 2008; Gatero, 2011).

Oye *et al.* (2011) stated that the Internet has now become very popular and far exceeds the technologies before it. Despite the benefits of the Internet, the resources are not fully utilised due to time constraints, inadequate infrastructure, lack of information searching skills, lack of motivation and acceptance (Renwick, 2005; Callen *et al.*, 2008); this is true of Nigeria. With the continued rapid growth of the Internet, it is vital to understand the motivational factors associated with its usage among resident doctors in Nigeria.

Literature review

Motivation is a basic concept in human behaviour and a driving force within individuals that moves them to take a particular action (Jamal and Foxall, 2009). Motivation is fundamental to cognition, behaviour and communication. It is one of the most significant components of learning in any educational environment (Jadric *et al.*, 2010). The significance of motivation as the most relevant factor of success has been emphasised in both traditional and online education (Yukselturk and Bulut, 2007; Lin, 2007). Igbaria *et al.* (1995a) noted that acceptance and use of computers by individuals is limited due to low motivation.

Researchers in the field of information studies have provided various answers to what motivates individuals to adopt and use technology. Davis (1989) states that people expend effort due to both extrinsic and intrinsic motivation, while Saade *et al.* (2007) identified intrinsic and extrinsic motivation as relevant for the learning outcome and experience with online tools. Extrinsic motivation is defined as the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself. Hence, “perceived usefulness” (PU) is a form of extrinsic motivation. Intrinsic motivation refers to the performance of an activity for no apparent reinforcement other than the process of performing the activity *per se*. “perceived ease of use” (PEU) and “perceived enjoyment” (PEJ) are forms of intrinsic motivation (Rao, 2007).

Empirical studies in America (Davis *et al.*, 1989; Igbaria *et al.*, 1989; Venkatesh and Davis, 2000), Singapore (Teo *et al.*, 1999; Teo, 2001) and Malaysia (Ramayah *et al.*, 2003) have established that PEU, PEJ and PU influence user acceptance and usage behaviour of information technologies. Lin (2007) examined the role of both extrinsic and intrinsic motivators in explaining employee knowledge-sharing intentions in Taiwan. Other motivators were found to be significantly associated with employee knowledge-sharing attitudes and intentions. Individuals tend to use a system that they perceive would help them achieve task performance (Davis, 1989). PU is a major determinant of systems usage (Davis *et al.*, 1989; Adams *et al.*, 1992).

The introduction of computers and the Internet has brought about increased access to the medical literature. Clinicians and medical researchers now rely on the Internet for

health information for patient management and research purposes. They use Internet information resources because they are readily available, easy to access and quickly retrieved for prompt health-care decision-making. A survey among Auckland general practitioners found that all the participants were using the Internet to seek for questions requiring an answer now and for future learning (Gravatt and Arroll, 2010). Despite the advantages of the Internet, some clinicians still prefer communication with colleagues and text sources (Dawes and Sampson, 2003; Coumou and Meijman, 2006). A study by Callen *et al.* (2008) revealed low use of online information sources by Mongolian doctors. During the past five years, the use of mobile devices (iPad, Android operating systems and smartphones) for accessing information online has greatly increased. Recent data showed that for the first time ever (October 2012), the number of Nigerians accessing the Internet via their mobiles devices outnumbered those of desktop Internet users (StateCounter GlobalStats, 2012).

The use of Internet services in clinical practice is near-universal among physicians, and their motive for going online varies (Sarasoehn-Kahn, 2012). Moick and Terlutter (2012) noted three motive dimensions of Internet use by physicians:

- (1) being on the cutting edge;
- (2) self-expression; and
- (3) for efficiency, effectiveness, diversity and convenience.

Few studies exist that focused on motivational factors influencing the utilisation of Internet health information resources by resident doctors in Nigeria. The study findings which are presented in this article were designed to fill this gap in knowledge. The main objective of this study is to determine the influence of motivational factors (PEU, PEJ and PU) on the utilisation of Internet health information resources by resident doctors in tertiary health-care institutions in south-west Nigeria.

The specific objectives are to:

- determine the relationship between PEU and the utilisation of Internet health information resources by resident doctors;
- ascertain the relationship between PEJ and the utilisation of Internet health information resources of resident doctors;
- explore the relationship between PU and the utilisation of Internet health information resources by resident doctors; and
- determine the influence of PEU, PEJ and PU on utilisation of Internet health information resources by resident doctors in tertiary health-care institutions in Nigeria.

The following null hypotheses guided the conduct of this study and were tested at the $p < 0.01$ level of significance:

- H1.* There is no significant relationship between PEU and the utilisation of Internet health information resources by resident doctors.
- H2.* There is no significant relationship between PEJ and the utilisation of Internet health information resources of the respondents.

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- H3. There is no significant relationship between PU and the utilisation of Internet health information resources of resident doctors.
- H4. Motivational factors (PEU, PEJ and PU) will not significantly influence utilisation of Internet health information resources by resident doctors.

Scope of the study

This study includes all of the 1,280 resident doctors (registrars and senior registrars) who are medical doctors undergoing postgraduate (residency) training to become specialists in different medical specialties in 13 tertiary health-care institutions in south-west Nigeria. The tertiary health-care institutions include federal and state university teaching hospitals, federal medical centres and specialist hospitals that have residency training programmes. It excludes other categories of clinicians such as medical consultants (specialist), medical officers and house officers (interns). The study focused on the influence of motivational factors (PEU, PEJ and PU) on the utilisation of Internet health information resources among resident doctors.

Theoretical background

Researchers have used several theoretical models to study user acceptance and adoption of ICT. Of all the models adopted by previous researchers, the technology acceptance model (TAM) is the most popular. The TAM was an adaptation of the theory of reasoned action developed by [Ajzen and Fishbein \(1980\)](#). The TAM was developed by [Davis \(1989\)](#) and [Davis et al. \(1989\)](#) to identify the determinants of information technology (IT) adoption and usage by individual users. The TAM posits that two external variables (namely, PEU and PU) are relevant for computer acceptance behaviours. The TAM explains the causal links between beliefs about the usefulness and ease of use of an information system and users' attitudes, intentions and actual usage of the system. Studies have shown that individuals adopt technology because it is considered to be beneficial to them ([Adams et al., 1992](#); [Igbaia et al., 1995b](#); [Teo, 2001](#)) and also because they derive enjoyment from its use ([Ramayah et al., 2003](#), [Teo et al., 1999](#)).

Motivation is a concept consisting of intrinsic and extrinsic factors ([Davis, 1989](#); [Deci and Ryan, 1985](#); [Vallerand, 1997](#)). Motivation theorists argued that system usage is determined by two constructs, namely, PEU (intrinsic) and PU (extrinsic). Intrinsic motivation refers to behaviours that individual's exhibit for their own sake without expecting any reward. When individuals are intrinsically motivated, they freely and with interest participate in activities without expecting any reward. Behaviours that are intrinsically motivated emerge from the self. Intrinsically motivated behaviour arises from people's need to feel competent and self-determining in dealing with their environment ([Rao, 2007](#)). According to [Malone \(1981\)](#), intrinsic motivation is triggered by challenge, curiosity, control and fantasy.

PEU is the degree to which a person believes that using a particular system would be free from effort ([Davis et al., 1989](#)). [Teo \(2001\)](#) asserts that effort is a finite resource that a person may allocate to the various activities for which he or she is responsible. An application perceived to be easier to use is more likely to be accepted by the users. Several empirical studies ([Adams et al., 1992](#); [Agbonlahor, 2006](#); [Igbaia et al., 1996](#), [Ramayah et al., 2002](#)) found PEU to be influential in system usage. On the other hand, PEJ is the extent to which using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated ([Devis, 1992](#);

Malone, 1981). Medical practitioners will be motivated to do or repeat an activity such as using the Internet if they find it enjoyable compared to the same activity that is unenjoyable. Teo (2001) found that Internet users in Singapore perceived the Internet to be useful to their job, enjoyable and easy to use.

Motivation plays a critical role in user acceptance and use of IT. Regardless of the type of motivation, doctors who are motivated are more likely to use Internet health information resources (Moick and Terlutter, 2012). Extrinsic motivation is the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself (Deci and Ryan, 1985; Ji-Won and Young-Gui, 2001). Extrinsic motivation influences behaviour due to the reinforcement values of the outcomes, as it is behaviours that are used to achieve a specific goal (Venkatesh, 1999). PU is described as a form of an extrinsic motivation (Atkinson and Kydd, 1997). Davis (1989) defined PU as the level of belief a person has that the system will improve his or her job performance. A system that is high in PU is one that the user believes will have a positive use-performance relationship (Davis, 1989; Henderson and Divett, 2003). Medical practitioners would most likely adopt and use Internet health information resources if they perceive it will enhance their job performance (Abdel-Wahab *et al.*, 2009).

Previous studies (Teo, 2001; Ramayah *et al.*, 2003; Agbonlahor, 2006) found PU to be directly related to system usage. Ramayah *et al.* (2003) concluded that PU is the main driver of technology usage. Agbonlahor (2006) noted that PEU and PU are positively related to IT applications and system usage by Nigerian academics. Individuals tend to use systems that they perceive would improve their task performance. Previous studies found that TAM yields consistently high explained variance in users' choices to utilise information systems (Mathieson, 1991). Hence, the TAM will be utilised in this study.

Research model

The research model for this study is shown in Figure 1. This model is an adaption of the TAM. The model seeks to examine the influence of motivational factors (intrinsic and extrinsic) on usage of Internet health information resources by resident doctors in Nigeria. The model postulates that PEU and PEJ (intrinsic motivators) directly influence usage of Internet health information resources. Also, the model shows that PU (extrinsic

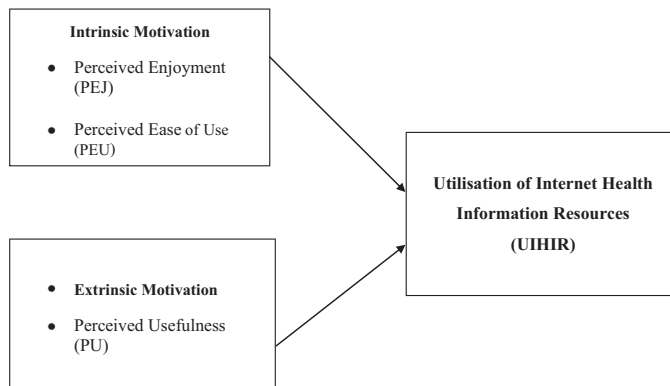


Figure 1. Research model of motivational factors influencing utilisation of Internet health information resources

motivator) has direct influence on the utilisation of Internet health information resources by resident doctors in south-west Nigeria.

Research methodology

Setting

Descriptive survey design was used for this study. The study population consisted of 1,280 resident doctors in 13 tertiary health-care institutions in south-west Nigeria. The total enumeration (census) technique was adopted to cover a population size of 1,280 resident doctors in the 13 tertiary health-care institutions in south-west Nigeria.

Measures

A pre-tested, self-administered questionnaire was used for data collection. The questionnaire elicited information on the demographic characteristics of the respondents, PEU, PEJ and PU. PEU and PU were measured using a 5-point Likert scale with 1 = strongly disagree to 5 = strongly agree. The items used to measure PEU and PU were adapted from [Davis \(1989\)](#), [Igbaria *et al.* \(1995a, 1995b\)](#) and [Teo \(2001\)](#). PEJ was measured using seven pairs of adjectival opposites (positive and negative adjectives) on a 7-point scale where the positive adjectives had the highest score = 7, negative adjectives had the lowest point = 1 and neutral = 4. The scale was adapted from studies by [Igbaria *et al.* \(1995a, 1995b\)](#) and [Teo \(2001\)](#).

Recruitment/data collection procedures

All of the 1,280 resident doctors in the 13 tertiary health-care institutions in south-west Nigeria were invited to participate in the study. Administration of the questionnaire was done by the researcher and six trained assistants. The questionnaire was administered during Grand Rounds in most of the institutions/centres, while in others it was during the Annual Scientific Meetings of the Association of Resident Doctors. The data collection period was six months with 901 copies of the questionnaire completed and returned ([Table I](#)), giving a response rate of 70.4 per cent.

Method of data analysis

Data were analysed using descriptive statistics, Pearson product-moment correlation and multiple regression analysis.

The data from questions on PEU, PU and PEJ with 5-point Likert scale were analysed by aggregating the scores. The highest score was 5 for a positive response and 1 for a negative response. Those that strongly agree to a positive response receive five points, while those that disagree receive 1 point. There were ten items on PEU, giving a total score of 50 points. PU has 11 items with 5 being the highest score, totalling 55 points. The higher the point scored by a respondent, the higher the rate of motivation. The seven pairs on a 7-point differential semantic scale were used to measure PEJ. The more fun the Internet is to the respondents, the higher the score (7) and if it is frustrating, he/she earns 1 point. The more positive the statements, the higher the score, while the total score was summed and averaged to create a differential semantic scale score.

Ethical consideration

The Ethics Review Committees of University of Ibadan/University College Hospital (UCH), Ibadan, National Neuro-Psychiatric Hospital and Yaba, Lagos and

Table I.
Questionnaire
administered and
retrieved by
institutions/centres

S/N	Names of Health Institutions	Population	Questionnaires retrieved
1	University Teaching Hospital, Ibadan	350	306
2	Lagos University Teaching Hospital	200	72
3	Lagos State University Teaching Hospital	100	80
4	Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife/Ilesha	200	130
5	Ladoke Akintola University Teaching Hospital, Osogbo/Ogbomosho	60	51
6	Olabisi Onabanjo University Teaching Hospital, Sagamu	55	33
7	University Teaching Hospital (UTH, Ado-Ekiti)	10	10
8	Federal Medical Center (FMC), Abeokuta	45	33
9	FMC, Ido, Ekiti	60	59
10	FMC, Owo	80	70
11	National Orthopedic Hospital, Igbobi, Lagos	40	21
12	Neuropsychiatric Hospital, Abeokuta	25	21
13	Neuropsychiatric Hospital, Yaba, Lagos	50	17
	Total	1,280	901

Neuropsychiatric Hospital, Aro, Abeokuta, granted approval for this study. Also, informed consent was obtained from all the participants.

Results

Demographic characteristics of the respondents

The profile of the respondents is shown in [Table II](#). There were more males (69 per cent) than females (31 per cent) and 68.5 per cent of the respondents were married. The mean age of the respondents is 34.0 years. Slightly more than two-thirds (63.5 per cent) were registrars, while 36.5 per cent were senior registrars. A great majority (93.5 per cent) hold the Bachelor of Medicine and Surgery/Bachelor of Dental Surgery (MBBS/BDS) degree. A total of 80.2 per cent have been in residency programmes for less than five years; however, 45.6 per cent have been in medical practice for between five and nine years.

PEU and the utilisation of Internet health information resources by resident doctors

[Table III](#) presents PEU and the utilisation of Internet health information resources by the respondents. The Table also shows mean (\bar{X}), standard deviation (SD) and variance scores of items measuring PEU and utilisation of Internet health information resources of the respondents. The majority of the respondents agreed that using the Internet to access health information would be easy, as shown in their responses to the following statements: "I find using the Internet easy to access health information" ($\bar{X} = 3.9$, $SD = 0.93$) and "it is easy for me to remember how to retrieve health information from the Internet" ($\bar{X} = 3.8$, $SD = 0.91$). Respondents disagreed to the following statements: "using the Internet to access health information is not easy for me" ($\bar{X} = 2.0$, $SD = 1.02$) and "using the Internet to access health information would be difficult for me" ($\bar{X} = 1.8$, $SD = 0.88$).

Demographic Variables	Frequency	Percentage (%)
<i>Gender</i>		
Male	620	69.0
Female	281	31.0
<i>Age</i>		
< 30	105	11.7
30-39	708	78.5
40-49	81	9.0
50 and above	7	0.8
34.0 ± 4.46		
<i>Marital status</i>		
Single	284	31.5
Married	617	68.5
<i>Designation</i>		
Registrar	572	63.6
Senior Registrar	329	36.4
<i>Educational qualification</i>		
MBBS/MBChB/BDS	842	93.5
MSC	23	2.5
MPH	21	2.3
PGD (Postgraduate Diploma)	15	1.7
<i>How long have you been in residency?</i>		
No response	39	4.4
< 5 years	723	80.2
5 years and above	139	15.4
<i>Length of medical practice</i>		
No response	109	12.1
< 5 years	211	23.4
5-9 years	411	45.6
10-14	142	15.8
15 years and above	28	3.1

Table II.
Demographic
characteristics of the
respondents

PEJ and the utilization of Internet health information resources by resident doctors

Table IV shows PEJ and the utilisation of Internet health information by resident doctors. Respondents felt that using Internet health information resources was pleasurable ($\bar{X} = 5.2$, $SD = 1.44$), fun ($\bar{X} = 5.1$, $SD = 1.51$), enjoyable ($\bar{X} = 5.3$, $SD = 1.45$) and pleasant ($\bar{X} = 5.3$, $SD = 1.37$).

PU and utilisation of Internet health information resources by the respondents

PU and the utilisation of Internet health information resources by resident doctors is shown in Table V. Also shown are the mean, standard deviation and variance scores of PU and the utilisation of Internet health information resources of the respondents. The majority agreed that using the Internet will increase their job performance ($\bar{X} = 4.5$, $SD = 0.78$) and be useful for their work ($\bar{X} = 4.3$, $SD = 0.74$). However, respondents were

Table III.
PEU and the
utilization of internet
health information
resources by resident
doctors

PEU Items	Mean \bar{X}	SD	Variance
Using the Internet to access health information is not easy for me	2.0	1.02	1.04
Using the Internet to access health information does not require a lot of mental effort	3.0	1.21	1.46
I find it easy to use the Internet to obtain health information	4.0	0.89	0.80
I find the Internet easy to use in doing what I want	4.0	0.85	0.72
It would be easy for me to be skillful in using the Internet for accessing health information	4.0	0.81	0.65
Using the Internet to search for health information would be difficult for me	1.8	0.88	0.77
It is easy for me to remember how to retrieve health information from the Internet	3.8	0.91	0.86
I find it cumbersome accessing health information on the Internet	2.2	1.03	1.05
Overall, I find using the Internet easy to access health information	3.9	0.93	0.86

Table IV.
PEJ and the
utilisation of internet
health information
resources by resident
doctors

PEJ Items	Mean \bar{X}	SD	Variance
Fun	5.1	1.51	2.29
Frustrating	2.3	1.47	2.17
Pleasant	5.3	1.37	1.87
Unpleasant	2.1	1.46	2.13
Pleasurable	5.2	1.44	2.07
Unpleasurable	2.0	1.38	1.91
Exciting	5.3	1.44	2.07
Boring	2.1	1.46	2.12
Enjoyable	5.3	1.45	2.10
Unenjoyable	2.0	1.44	2.06
Positive	5.6	1.47	2.16
Negative	1.9	1.46	2.14
Wise	5.8	1.42	2.02
Foolish	1.5	1.22	1.50

neutral with respect to the statement: "My job would be difficult to perform without Internet health information resources for communication and decision support" ($\bar{X} = 3.3$, $SD = 1.13$).

Test of significant relationship between motivational factors and the utilisation of Internet health information resources by resident doctors

Table VI indicates that the mean scores of PEU, PEJ and PU are 30.26, 37.08 and 39.73, respectively. The test of $H1$, $H2$ and $H3$ shows there is a significant relationship between PEU ($r = 0.181$, $p < 0.01$), PEJ ($r = 0.166$, $p < 0.01$) PU ($r = 0.121$, $p < 0.01$) and utilisation of Internet health information resources by resident doctors. Therefore, a

PEU Items	Mean \bar{X}	SD	Variance	Internet health information resources
Using the Internet can increase my job productivity	4.5	0.78	0.60	113 <hr/> Table V. PU and the utilisation of internet health information resources by resident doctors
Using Internet health information resources gives me control over my job	4.0	0.85	0.72	
Using Internet health information resources enhances my effectiveness in performing my job	4.2	0.76	0.58	
Using Internet health information resources enables me to accomplish a task more quickly	4.1	0.89	0.79	
The Internet provides me with health information that will lead to better decisions for patient management	4.3	0.78	0.62	
Using Internet health information resources helps improve the quality of the clinical work I do	4.1	0.82	0.67	
My job would be difficult to perform without Internet health information resources for communication with colleagues and for decision support	3.3	1.13	1.27	
Internet health information resources addresses my job-related needs	3.9	0.86	0.74	
Internet health information resources support critical aspects of my job for efficient and effective patient care	3.9	0.84	0.70	
Overall, I find the Internet useful in my work	4.3	0.74	0.55	

Variables	<i>N</i>	Mean \bar{X}	SD	IHIR (<i>r</i>)	Significance <i>P</i>	Table VI. Test of significant relationship between motivational factors and utilisation of internet health information resources
Utilisation of IHIR	901	52.81	7.20	1.000	–	
PEU (Internet)	901	30.26	4.36	0.181	0.0008	
PEJ (Internet)	901	37.08	8.54	0.166	0.0016	
PU (Internet)	901	39.73	5.61	0.121	0.0021	

positive relationship exists between motivational factors and the utilisation of Internet health information resources by resident doctors.

Regression analysis of motivational factors and the utilisation of Internet health information resources by resident doctors

To determine whether PEU, PEJ and PU significantly influence the utilisation of Internet health information of the respondents, multiple regression analysis was used. The results obtained are shown in Table VII. The test of the fourth hypothesis revealed that collectively PEU, PEJ and PU have significant influence on utilisation of Internet health information resources of the respondents ($F = 15.366$, $df = 3$; 897 , $p < 0.01$).

Relative influence of motivational factors and the utilisation of Internet health information resources by resident doctors

Furthermore, the relative influence of motivational factors and the utilisation of Internet health information resources of the respondents is shown in Table VIII. The result revealed that PEU ($B = 0.864$, $df = 897$, $t = 3.906$, $p < 0.01$) and PEJ ($B = 0.349$, $df = 897$, $t = 3.060$,

$p < 0.01$) individually have significant influence on the utilisation of Internet health information resources. However, PU ($B = 0.232$, $df = 897$, $t = 1.328$, $p > 0.01$) does not significantly influence the utilisation of Internet health information resources of the respondents. In addition, multiple regression analysis revealed that motivational factors and utilisation of Internet health information resources of the respondents was significant ($R = 0.221$, $p < 0.01$). The value of adjusted R^2 , which is the measure of the goodness-of-fit of the model, is 0.045. This implies that motivational factors accounted for 4.5 per cent of the variation in the utilisation of Internet health information resources by the respondents.

The beta values in Table VIII indicate relative influence of the independent variables [motivational factors (PEU, PEJ and PU)] on the dependent variable (utilisation of Internet health information resources). One can infer that PEU has relative influence of 13.8 per cent, PEJ 11 per cent and PU 48 per cent on the utilisation of Internet health information resources of the respondents.

Discussion

The results showed that there is a significant positive relationship between motivational factors and utilisation of Internet health information resources. Collectively, motivational factors (PEU, PEJ and PU) have a significant relationship with the utilisation of Internet health information resources by resident doctors. This implies that resident doctors will use Internet health information resources they find to be useful, easy to use and enjoyable. This finding is consistent with previous empirical research (Adams *et al.*, 1992; Igbaria *et al.*, 1995a; Teo *et al.*, 1999; Teo, 2001). Individuals will adopt and use systems (Internet health information resources) they consider to be easy to use, enjoyable and beneficial (Teo *et al.*, 1999; Ramayah *et al.*, 2003). The easier to use the Internet, the less effort is needed to access health information resources by resident doctors and, thus, more use of the resources is likely. Also, Agbonlahor (2006) found that PEU and PEJ significantly influenced the number of IT applications used by lecturers in Nigerian universities.

PEU was found to have significant influence on the utilisation of Internet health information resources. Resident doctors will use Internet health information resources if they

Table VII.
Regression analysis of motivational factors and utilisation of internet health information resources

Model	Summation of square	df	Means square	F-ratio	R	R ²	Adjusted R ²	Standard error of estimate	Significance P
Regression	31,072.766	3	10,357.589	15.366	0.221	0.049	0.045	26.57224	0.0009
Residual	605,820.0	897	675.385						
Total	636,892.8	900							

Table VIII.
Relative influence of motivational factors on utilisation of the internet health information resources

Model	Unstandardised coefficients		Standardised coefficients	t	Significance P
	B (β)	Standard error	β		
(Constant)	4.522	8.036	–	0.563	0.574
PEU	0.864	0.221	0.138	3.906	0.000
PEJ	0.349	0.114	0.110	3.060	0.002
PU	0.232	0.175	0.480	1.328	0.185

find it easy to use. The possible explanation of this finding may be the variety of high-speed Internet browsers that are now readily available which makes it easy for people, including resident doctors, to browse the Internet and retrieve health information resources relevant to their needs. This finding is consistent with several empirical studies (Adams *et al.*, 1992; Davis, 1989; Chau, 2001; Ramayah *et al.*, 2002; Ramayah *et al.*, 2003) in which PEU was found to be influential in system usage. An application perceived to be easy to use is more likely to be accepted by the users. The easier a system is to use, less effort will be needed to conduct tasks, which means more work done and, hence, greater use. A study by Ndubisi *et al.* (2001), however, showed no significant effect on usage.

PEU has been found to influence usage indirectly through PU (Davis, 1989). One can infer that a system that is difficult to use is less likely to be perceived as useful. One implication of this finding is that system designers should design web pages that are easily accessible, appealing and readable. Systems that are difficult to navigate and/or contents that are difficult to read may not be attractive to users. Also, the easier it is to navigate the maze of health information resources on the Internet by resident doctors, the more their feeling of self-competence. This feeling of self-confidence and competence in accessing online health information resources will lead to enjoyment of the system, thereby increasing usage of online health information resources for research and patient care by resident doctors.

PEJ was found to significantly influence utilisation of Internet health information resources by resident doctors. This means that a resident doctor will be motivated to carry out an activity such as using the Internet if he/she finds it enjoyable and derives pleasure from using it in accessing health information resources such as journal articles and electronic books and for searching databases, such as MEDLINE/PubMed. The possible explanation could be the availability of various online resources (movies, games and music) that resident doctors could access and use for relaxation after their busy clinical schedules. In addition, resident doctors could find accessing online clinical videos relevant to their work pleasurable and enjoyable. This view is supported by Teo *et al.* (1999) and Ramayah *et al.* (2003). Resident doctors will use the Internet if they derive pleasure from using it. The implication of this finding is that system designers should consider PEJ of the users when designing systems and or web pages containing health information. To achieve this, systems designers must field test the draft online video materials to ensure that they meet the needs of the doctors.

PU has significant relationship with the utilisation of Internet health information resources. This finding is similar to that of previous studies (Davis, 1989; Davis *et al.*, 1989) in which PU was found to be directly related to system usage. A system that is instrumental in people achieving valued outcome is more likely to be used. Resident doctors will use Internet health information resources they perceive will improve their job performance. If they are able to obtain online health information relevant to their work, they are more likely to use the Internet.

PEU and PEJ are the main drivers of Internet usage by resident doctors. This finding collaborates that of Anandarajana *et al.* (2002) in which PU was found not to be a significant motivator in system usage. However, it is contrary to previous empirical research (Teo *et al.*, 1999; Teo, 2001; Ramayah *et al.*, 2003; Agbonlahor, 2006) in which PU was found to be the main driver of system usage. This view is collaborated by earlier studies (Davis, 1989; Igarria *et al.*, 1995a, 1995b; Igarria *et al.*, 1996). Ndubisi *et al.* (2001) tested TAM's validity among Malaysian entrepreneurs and found that IT usage was influenced directly by PU and indirectly by PEU via PU.

Conclusion and recommendations

PEU, PEJ and PU have significant relationship with the utilisation of Internet health information resources. However, PEU and PEJ significantly influence the utilisation of Internet health information resources of the respondents. This study, therefore, shows that intrinsic motivators (PEU and PEJ) are the main factors influencing the usage of Internet health information resources by resident doctors in south-west Nigeria. The findings of this study have implications for policy and practice. Designing easily accessible and retrievable web pages with high-quality health information will enhance usage of Internet health information for research and patient care by resident doctors. Provision of adequate Internet facilities for resident doctors at the point of care will increase usage of Internet health information resources by resident doctors for research and informed decision-making in the management of patients for better health outcomes.

We conclude by making the following recommendations:

- System designers should consider PEJ and PEU when designing web pages and/or developing applications that will be relevant to the needs of resident doctors.
- They should design web pages that can load easily and quickly and are easily accessed, appealing and readable.
- Institutions should provide reliable and fast access to the Internet to increase and sustain the use of Internet health information resources by resident doctors.
- Further research is necessary to determine why PU does not significantly influence the utilisation of Internet health information resources among resident doctors in Nigeria.

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Further reading

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