THE IMPACT OF INTERACTIVITY FEATURES IN ENHANCING ONLINE COMMUNICATION SATISFACTION

MOHD AZUL MOHAMAD SALLEH
UNIVERSITI KEBANGSAAN MALAYSIA

Abstract

Online systems are providing more interactive forms of participation in workplaces and other kinds of organizations. The spread of Internet-based technologies has led to a rapid expansion of online systems and information management systems. This research seeks to examine the importance of interactivity features in enhancing users' online communication satisfaction with Internet-based Information Management System (IBIMS) in four Malaysian research universities. This research uses the Outcome Interactivity Theory, communication satisfaction and Technology Acceptance Model (TAM) as the basis for constructing and measuring the relationship between interactivity features and online communication satisfaction. The data was gathered from 223 internal employees through a quantitative survey method. The results show that there is a significant relationship between interactivity features and online communication satisfaction when using IBIMS. This research makes a significant practical and theoretical contribution by integrating the interactivity features with technology acceptance to create users' online communication satisfaction. Moreover, this research has created new knowledge on understanding users' needs regarding online systems and applications at their workplace.

Keywords: *interactivity, Online Communication Satisfaction, Internet-based Information Management System, Technology Acceptance Model, research university*

IMPAK CIRI-CIRI INTERAKTIVI DALAM MENINGKATKAN KEPUASAN KOMUNIKASI DALAM-TALIAN

Abstrak

Sistem dalam-talian menyediakan satu bentuk penyertaan yang lebih interaktif di tempat kerja dan juga organisasi. Perkembangan teknologi berasaskan Internet telah membawa kepada berkembangnya sistem dalam talian dan sistem pengurusan maklumat. Kajian ini bertujuan untuk mengkaji kepentingan ciri-ciri interaktiviti bagi meningkatkan kepuasan komunikasi dalam-talian pengguna semasa mengguna Sistem Pengurusan Maklumat Berasaskan Internet (IBIMS) dalam kalangan empat buah Universiti Penyelidikan di Malaysia. Kajian ini menggunakan Teori Hasil Interaktiviti, konsep kepuasan komunikasi dan Model Penerimaan Teknologi (TAM) sebagai asas untuk membina dan mengukur hubungan di antara ciri-ciri interaktiviti dengan kepuasan komunikasi dalam-talian. Data kajian telah dikutip daripada 223 kakitangan universiti melalui kaedah kuantitatif secara kaji selidik. Keputusan kajian menunjukkan bahawa terdapat hubungan yang signifikan di antara ciri-ciri interaktiviti dengan kepuasan komunikasi dalam-talian apabila mengguna IBIMS. Kajian ini memberi sumbangan yang signifikan secara praktikal dan teoritikal dalam mengintegrasikan ciri-ciri interaktiviti dengan konsep penerimaan teknologi untuk menghasilkan kepuasan komunikasi dalam-talian bagi pengguna. Selain itu, kajian ini juga telah menghasil pengetahuan baru untuk memahami keperluan pengguna mengenai sistem dan aplikasi dalam-talian yang digunakan di tempat kerja mereka.

Kata kunci: *interaktiviti, kepuasan komunikasi dalam-talian, Sistem Pengurusan Maklumat Berasaskan Internet, Model Penerimaan Teknologi, universiti penyelidikan*

Introduction

Interactivity is an important buzzword in communication processes through new media and digital media. It plays the role of key driver that increases interaction and participation among end users when they are using online communication tools such as Internet-based systems. According to Rafaeli (1988), interactivity is an expression of the "extent to which in a given series of communication

exchanges, any third (or later) transmission (or message) is related to the degree to which previous exchanges refer to even earlier transmissions" (p.111). Steuer (1995) states interactivity is the "extent to which users can participate in modifying the form and content of a mediated environment in real time" (p. 46). The most recent definition of interactivity from outcome interactivity theory, is that interactivity is the perception of the degree to which a user experiences, contents and the relevant integration of technological features that results in positive interactivity and satisfaction (Gleason 2007).

Fiore (2008) claims that interactivity is important to end users because it means interacting with information and content through new digital technologies. Fiore also believes that interactive features provide more user satisfaction in participation and interaction when using digital technology. However, in the context of interaction through computer-mediated communication and online communication such as information management systems, Gotved (2006) argues that the online structure of the systems creates possibilities for interactivity and communication. Poster (2007) in an earlier study shows that the computer games industry focuses on interactivity features because texts, graphics, audio and video all interact in the context of real-time game activities. He also believes that the new media environment provides tremendous interactivity that increases and generates user's feelings and significant personal experiences.

The term interactivity has been discussed and defined by Downes and McMillan (2000), McMillan (2002), Cover (2006), and Gleason (2008). They discuss the theoretical implications of interactivity for communication research in traditional and new media. However, Bucy (2004) claims that most communication scholars say that the concept of interactivity in mass communication research is a phenomenon of new media technology such as radio and television, networked media, online communication and online systems where information is shared and exchanged electronically. Additionally, users need interactivity to provide user control so that they can interact electronically with input devices such as mouse, keyboard and touch screen monitor.

According to Bucy (2004), interactivity in a real online environment involves participation and interaction via online-mediated communication devices and communication technologies. Bucy and other researchers also believe that communication devices and technologies will raise interpersonal interactivity (Massey & Levy 1999), user-to-user interaction (McMillan 2002), and human interaction (Stromer-Galley 2004). Thus, interactivity plays an important role in providing more opportunities for users to become involved in communication processes through an online environment. Furthermore, McMillan (2002) not only claims that interactivity involves user-to-user interaction, but states that interactivity also consist of participations and interactions between user-to-system, and user-to-documents. This statement is supported by theorists such as Shannon and Weaver (1949) who argue that interactivity is a two-way interaction and participation between either humans, animals or machines. Later,

Stromer-Galley (2004) classified interactivity in two dimensions: interactivity between people and interactivity between people and computers. This point of view shows that interactivity enhances user interactions through communication technologies.

In human communication, most people have looked at interactivity as a form of social participation, user-to-user participation and face-to-face communication. However, this view has changed since information and communication technology is now the most usual communication tool in our daily lives. The perspective put forward here concerns how users make contact through online communication technology. End users' perceptions of interactions are important in understanding the access factors relating technology to acceptance, and how users interact with interactive features in online communication environments. Davis (1989) developed the Technology Acceptance Model (TAM) to study users' perception to measure and explain attitudes towards the use of technology.

Furthermore, interactivity offers many advantages to enhance participation and user experiences in using online systems, but some users are not satisfied with adopting and using available systems. According to McMillan (2002), there are many suitable principal drivers that measure and explain relationships between interactivity and attitude, particularly when examining attitudes towards online systems. For example, Chen and Yen (2004), Dolen, Dabholkar and Ruyter (2007) and Gleason (2008) claim that interactivity features influence users' behavioural intentions and attitudes when looking at web sites and engaging in online chats. However, instead of interactivity, many key drivers have been investigated by researchers to examine and explain user acceptance and satisfaction when using online systems. These include, for example, ease of use and usefulness (Davis 1989), time saving and productivity (Baker et al. 1999), usability (Preece 2001), senior management endorsement and computer literacy (Vreede, Mgaya & Qureshi 2003), information quality, system quality and service quality (Lin, Fan & Zhang 2009) and user satisfaction (Simha & Kishore 2009).

This study examines the effects of interactivity features in using IBIMS on specific variables: communication satisfaction and attitudes towards use. This study argues that knowledge is still lacking about 'how' interactivity features affect communication satisfaction and attitudes towards the use of online systems. The impacts of interactivity on online communication and interaction perspective will be discussed in the context of technology acceptance and usage. In short, this article discusses the effect of interactivity features on communication satisfaction concerning employees in Malaysian research universities.

Elements of the study

IBIMS is one of the most effective systems for improving communication processes and information management to enhance organisational performance. According to Reinig, Briggs and Vreede (2009), users tend to lose confidence in technology when their experience is very unsatisfactory. The degree of acceptance

and usage is important to improve the ways in which end users can optimise electronic systems in their working environments. This study seeks to investigate to what extent interactivity features impact on communication satisfaction when using IBIMS. The study adapts Outcome Interactivity Theory (Gleason & Lane 2009), communication satisfaction and Technology Acceptance Model (Davis 1989) to develop a suitable theoretical framework as shown in Figure 1.

According to Gleason and Lane (2009), we can measure perceived interactivity through users' perceptions based on a combination of three important elements: technological features, user experience, and content. Firstly, technological features constitute the interactive features of technology to enhance user control, communication speed and customisation. Second, user experiences are the extent to which an individual user responds to one or more interactive elements in a system such as its ability to interact, link with other contents and respond to instructions. Finally, content can be defined as elements such as data, information, menu and hyperlinks that facilitate active participation and interaction.
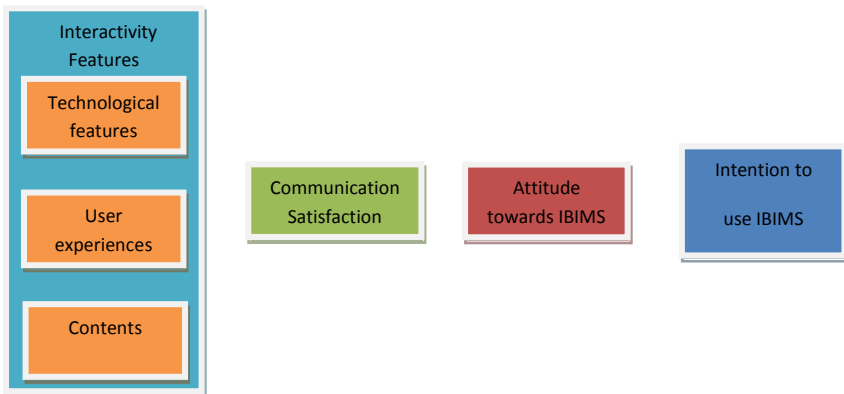

Figure 1: Elements in theoretical framework

Gleason and Lane (2009) also believe that ways in which technological features are perceived, user experiences and content all directly impact on interactivity. They also claim that there is a positive relationship between interactivity and user satisfaction. Furthermore, these elements help researchers to explain 'why' interactivity features influence user perception and satisfaction. This study also wants to explain and predict if these elements reflect on communication satisfaction and in turn, acceptance of IBIMS.

In 1977, Downs and Hazen stated that communication satisfaction is important for examining and determining how individuals discover a relationship between communication and satisfaction. They used a Communication Satisfaction Questionnaire (CSQ) with eight key factors, these being communication climate, supervisory communication, organisational integration, media quality,

co-worker communication, corporate information, personal feedback and subordinate communication to determine individual communication satisfaction (Downs & Hazen 1977). Two decades later, Mount and Back (1999) also defined communication satisfaction as individual satisfaction with communication which is related to the individual's satisfaction and position in the workplace. Consequently, this study uses CSQ as devised by Downs and Hazen (1977) to develop a basis for assessing individual online communication satisfaction, and argues that there is a significant relationship between online communication satisfaction and attitude towards the use of IBIMS.

In previous technology acceptance studies, Davis, Bagozzi and Warshaw (1989), Kim, Lee and Law (2007) and Castaneda, Leiva and Luque (2007) use TAM to understand people's attitudes and intentions to use new technology. They further claim that users' attitudes also have a significant effect on their intentions to operate the systems. In line with this reasoning, Premkumar and Bhattachherjee (2008) indicate there is a significant relationship between end users' attitudes towards and intention to use a specific system. This study argues that there is a link between employees' attitude towards use and intention to use IBIMS in Malaysian research universities.

Methodology of the study

This section explains the quantitative method used to examine the influence of interactivity and communication satisfaction on users' attitudes and behaviour towards IBIMS usage. The data collection used a questionnaire in a field survey to gather empirical data at four research universities in Malaysia (University of Malaya, University Science Malaysia, The National University of Malaysia and University Putra Malaysia). Research universities were selected for this study because of their widespread use of online information management systems. The empirical data was collected through a paper-based survey administered by the researcher because most previous studies used this technique in their analyses (Davis 1989; Lin & Lee 2006; Kim, Lee & Law 2007; Premkumar & Bhattachherjee 2008). The questionnaires were randomly distributed through purposive sampling among executive officers and academic staff. These respondents have been selected because they spend significant amounts of time using several types of IBIMS in their everyday working environment.

The variables used in this study are: interactivity features (technological features, user experiences and content); communication satisfaction; attitude toward the use of IBIMS; and actual use of IBIMS. The scale items for the instrument use multiple-item scales adapted from many studies in technology acceptance, communication satisfaction and interactivity. The items for the variables were created, adapted and modified from previous studies to suit the context of IBIMS use by employees in Malaysian universities. The items measured use a five-point Likert scale between 1 = strongly disagree and 5 = strongly agree.

The items in the interactivity section are new and their development is based on the Outcome Interactivity Theory as suggested by Gleason and Lane (2009). This section consists of 11 items that measure IBIMS interactivity features such as user control, communication speed, ability, connectedness, accessibility and relevance. Then, 12 items dealing with communication satisfaction were adapted from Communications Satisfaction Questionnaire (CSQ) developed by Down and Hazen (1977) to examine the level of communication satisfaction with IBIMS. There are six items adapted from Kim, Lee and Law (2007) and Castaneda, Leiva and Luque (2007) to evaluate attitudes towards using IBIMS. Five items regarding intention to use IBIMS were developed from Tung, Chang and Chou (2007) and Castaneda, Leiva and Luque (2007); these measure the usage of the systems. The final section consists of collected basic data and information about respondents' characteristics.

This study undertakes a preliminary study of the instrument through a pilot test to examine its validity and reliability. The instrument was tested among Malaysian postgraduate students in Adelaide. Most of these postgraduates are academic staff from various universities in Malaysia. They have used many types of IBIMS in their workplace environments. The data was analysed using statistical software, i.e. SPSS 17.0. A reliability analysis was conducted here to examine the internal consistency of research tools that measure the Cronbach's alpha coefficient values for all sections (variables) in the main study. The values for the new group of variables in this study also show alpha values exceeding the minimum value of acceptability in social sciences, 0.60 (Hair et al. 1998). The alpha values are as follows: interactivity features (0.946), online communication satisfaction (0.947), attitude towards use (0.959) and intention to use (0.950).

Findings of the study

The return rate of the questionnaires was 92.92% or 223 responses out of 240 employees. Out of 240 distributed questionnaires, 223 were returned. As presented in Table 1, the majority (86.1%) of the respondents are aged 20 – 49 years. In terms of ethnicity or race, the majority (85.7%) of respondents are Malay, followed by Chinese (4.5%), Indian (4.0%) and Bumiputera and others (4.0%). In terms of gender the ratio of male to female respondents is almost equal: 49.3% male and 50.7% female. With respect to position, 44.4% of the respondents are executive officers and 48.9% are lecturers, while 6.7% of the respondents work in other positions such as language teacher (academic) and research officer (executive). In terms of monthly income, most of the respondents receive a salary of above RM2000. The educational background shows that two-thirds (65.0%) of respondents have a postgraduate degree (Masters and PhD), 33.6% hold a bachelor degree and 1.3% have a diploma. The findings also show that 87% of the respondents have used computers for more than seven years and 82% also have more than seven years' experience in using the Internet in their daily work. This study shows that most respondents have good computer and

Internet experience, knowledge and skills, so they are able to execute their tasks using IBIMS.

As shown in Table 1 below, simple linear regression was used to test the effect of interactivity features on online communication satisfaction. The analysis shows that interactivity features had a statistically significant effect on online communication satisfaction ($p<0.01$). In the model, interactivity features explained 60.1% of the variance in online communication satisfaction. Thus, this result demonstrates there is a significant relationship between interactivity and online communication satisfaction in using IBIMS.

Table 1: Simple linear regression analysis for online communication satisfaction (OCS) and interactivity features (IF)

Model (independent variables)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
IF	0.781	0.043	0.775	18.247	0.000*

R	0.755
R Square	0.601
F	332.951*
Durbin-Watson	1.826

* $p<0.01$ – Dependent Variable OCS

Furthermore, Table 2 indicates that online communication satisfaction had a statistically significant effect on attitude towards use ($p<0.01$). In this model, online communication satisfaction explained 60.4% of the variance in attitude towards use. This result indicates there is a significant relationship between online communication satisfaction and attitude toward using IBIMS.

**Table 2: Simple linear regression analysis for attitude towards use
(ATU and online communication satisfaction (OCS)**

Model (independent variables)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
OCS	0.932	0.051	0.777	18.347	0.000*
R	0.777				
R Square	0.604				
F	336.606*				
Durbin-Watson	1.812				

* $p < 0.01$ – Dependent Variable ATU

Following this, Table 3 indicates that attitudes towards use had a statistically significant effect on intention to use ($p < 0.01$) where attitude towards use explained 74.7% of the variance in intention to use. Consequently, this outcome reveals employees' attitudes towards using the system did have a significant effect on their intention to use IBIMS.

**Table 3: Simple linear regression analysis for attitude towards use
(ATU and intention to use (ITU)**

Model (independent variables)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
ATU	0.808	0.032	0.865	25.576	0.000*
R	0.865				
R Square	0.747				
F	654.110*				
Durbin-Watson	2.254				

* $p < 0.01$ – Dependent Variable ITU

These findings reveal that interactivity features are important in influencing employees' online communication satisfaction when they utilize IBIMS. Furthermore these results also emphasize the importance of online communication satisfaction in influencing employees' attitude to use IBIMS.

Discussion and implications

Interactivity is an important variable that has been discussed in the last two decades. Bucy (2004) and Gleason (2008) claim that previous studies on interactivity focus on theory and description rather than prediction and empirical testing in 'real world' employment of new information technology and new media. They argue there is little or no empirical investigation to explain and understand to what extent interactivity motivates users to engage with technology. Also, according to Bucy (2004), the study of interactivity has lacked a theory of interactivity to explain how the phenomenon operates in the real environment of networked societies. However, this study does show the effect of interactivity features on end users' online communication satisfaction and their attitudes regarding the use of IBIMS.

The findings of the study show that interactivity features have a significant effect on end users' online communication satisfaction. The combination of technological features, user experiences and content are important to enhancing their satisfaction with online communication. This finding is supported by several studies, for example Chen and Yen (2004) claim that interactivity features on a web site enhance and improve end users' satisfaction. Similarly, Bucy (2004) states there is a relationship between interactivity and user satisfaction. Bucy argues that interactivity provides many benefits and advantages to the user, especially in motivating people to use media technology. Dolen, Dabholkar and Ruyter (2007) also believe that interactivity features in online chat influence end users' satisfaction. Therefore, higher satisfaction levels among end users will affect their loyalty to and acceptance of the product (Fiore 2008).

The findings also indicate that interactivity features should be focused on by the system developer in order to improve end users' satisfaction and attitude toward IBIMS. A previous study shows that students also need interactivity features that are part of online learning systems so that they can improve their participation and interaction. These features will enhance teaching and learning processes (Sims 2000). If the students require interactivity in using learning management systems, then employees in universities also need interactivity features in order to increase and improve their online interaction and communication needs. This study bridges the gap between interactivity features and online communication satisfaction.

Furthermore, the findings show that there is a significant relationship between online communication satisfaction and attitudes regarding the use of IBIMS. This study argues that a high score for online communication satisfaction has a greater effect on Malaysian research university staff attitudes towards IBIMS. Organisations should actively conduct online communication satisfaction audits in order to understand employees' feelings and satisfaction on IBIMS usage. In their studies, Downs and Hazen (1977), and Sparks (1994) indicate the importance of communication satisfaction in providing effective communication processes for staff members. However, they did not focus specifically on end users' online

communication satisfaction, acceptance of technology and levels of usage. This study enhances our understanding of end users' online communication satisfaction in a real educational environment in a developing country.

In research universities, the positive acceptance of systems usage is important in creating a world class ICT infrastructure, to increase the efficiency of data management, and to improve institutional repositories in thier management, research and publication objectives. In addition, it will have a significant and positive impact on communication processes, individual and organization profiles, teaching and learning, and collaborative organisational management. It will assist in creating a meaningful Key Performance Index (KPI) and improve the ranking of research universities so that they have the potential to become the premier universities in Malaysia. For example, Othman, Ismail and Md Raus (2009) claim that online systems in universities are essential for improving work and time efficiencies through interoperability and flexibility.

This study provides important practical implications and strategic guidelines for organisations to develop IBIMS. The implementation of IBIMS will succeed when the end users establish ease of use because of the system's interactivity features. Management and system developers in research universities should aim to increase the flexibility of technological features and contents to enhance users' experience of improved software developments. They also need to highlight the importance of online communication satisfaction in their ICT strategic plans. These implications will have several impacts on universities: increase the level of using IBIMS to facilitate management and administrative work; manage research outcomes; store and promote research publications; and improve teaching and learning processes.

Like previous empirical studies, this study has its limitations. The empirical data was collected in only four research universities in a developing country, Malaysia. The research findings may vary from one university to another university and from one country to another. Online communication satisfaction, acceptance and usage patterns may significantly differ between universities and countries, depending on cultural, political and economic contexts, system implementation, infrastructure, technology literacy, and social differences, etc. Further research is required to examine and confirm the findings of this study in other universities and countries, and therefore justify the model. Another limitation of this study is that the data was collected among the executive officers and academic staff. Further suggestions for future research are needed to test the proposed model among administration personnel using different methods (multi-method or mixed-method) and larger sample sizes to validate the model devised here.

Conclusions

In order to support the participation and communication processes in various types of organisations, Internet-based applications play an important role as

communication tools in an increasingly virtual environment. The availability of IBIMS not only supports better interaction but brings new practices that people can employ in organisations. It helps them to collaborate and exchange data and information in their daily work. This study shows and argues that interactivity features play a significant role to improve end users' communication satisfaction through online environment and influence their attitudes when engaging with IBIMS. Online communication and interaction through Internet-based systems may change the user control, accessibility, communication speed and communication flow, change management, accountability and efficiency of working styles in higher education institutions. All of these features are important in allowing end users to interact, access and share online material.

About the Author

Mohd Azul Mohamad Salleh is a Senior Lecturer at the School of Media and Communication Studies, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia. He is currently pursuing his Doctoral Degree at the University of Adelaide, Australia. He can be contacted at azul@ukm.my.

References

Baker, E, Geirland, J, Fisher, T, & Chandler, A. (1999). Media Production: Towards Creative Collaboration Using Communication Networks. Computer Supported Cooperative Work, Vol. 8, pp.303–332.

Bucy, E. P. (2004). Interactivity in Society: Locating an Elusive Concept. The Information Society. Vol. 20, pp. 373–383.

Castaneda, J. A., Leiva, F. M & Luque, T. (2007). Web acceptance model (WAM): Moderating effects of user experience. Information & Management, vol. 44, pp. 384-396.

Chen, K & Yen, D. C. (2004). Improving the quality of online presence through
interactivity. Information & Management. Vol 42, pp. 217–226.

Cover, R. (2006). Audience inter/active: Interactive media, narrative control and reconceiving audience history. New Media & Society. Vol. 8, No. 1, pp. 139–158.

Davis, F.D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly. September. pp. 318-340.

Davis, FD, Bagozzi, RP & Warshaw, PR. (1989). User acceptance of computer technology; a comparison of two theoretical models. Management Science. vol. 35. no. 8, pp. 982-1003.

Dolen, W. M., Dabholkar, P. A & Ruyter, K. (2007). Satisfaction with Online Commercial Group Chat: The Influence of Perceived Technology Attributes, Chat Group Characteristics, and Advisor Communication Style. Journal of Retailing. Vol. 83, No. 3, pp. 339–358.

Downs, C.W. & Hazen, M.D. (1977). A factor analytic study of communication
Satisfaction. The Journal of Business Communication. vol. 14, no. 3, pp.63-73.

Downes, E & McMillan, S. (2000). Defining interactivity: a qualitative identification of key dimensions. New Media & Society. Vol 6. No. 2, pp. 157-179.

Fiore, A. M. (2008). The Digital Consumer: Valuable Partner for Product

Development and Production. Clothing and Textiles Research Journal, Vol. 26, No. 2, pp. 177-190.

 Gleason, J. P & Lane, D. R. (2009).   Interactivity Redefined: A First Look at Outcome Interactivity Theory. viewed 10 September 2009, <http://people. eku.edu/gleasonj/Outcome_Interactivity_Theory.pdf>.

Gleason, J. P. (2008).   The Responsive Multi-Dimensional Model of Interactivity, Department of Communication, Eastern Kentucky University, viewed 1 August 2009,<http://people.eku.edu/ gleasonj/2008%20GSA%20paper%20_RMD%20model_.pdf>.

Gleason, J. P. (2007). More than the medium: the unique role of content in user perception of interactivity.   International Journal of the Book. Vol. 5, No. 1, pp. 77-84.

Gotved, S. (2006). Time and space in cyber social reality. New Media Society. Vol. 8, No. 3, pp. 467-486.

Hair, JFJ, Anderson, RE, Tatham, RL & Black, W.C. (1998). Multivariate data analysis. 5th ed. New Jersey: Prentice Hall.

Kim, T.G., Lee, J. H & Law, R. (2007). An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model. Tourism Management,.viewed 1 September 2008, <http://www.elsevier.com/locate/tourman>

Lin, H., Fan, W & Zhang, Z. (2009). A qualitative study of Web-based knowledge communities: examining success factors.   International Journal of e-Collaboration. Vol. 5, No. viewed 4 August 2009, <http:// find.galegroup.com/itx/infomark.do?&contentSet=IAC-Documents&type =retrieve&tabID=T002&prodId=AONE&docId=A203129230&source=g ale&srcprod=AONE&userGroupName=adelaide&version=1.0>.

Lin, H.-F & Lee, G.G. (2006). Determinants of success for online communities: an empirical study.   Behaviour & Information Technology. Vol. 25, No. 6, pp. 479 – 488.

Massey, B. L & Levy, M. R. (1999). Interactivity, online journalism, and English-language Web newspapers in Asia.   Journalism & Mass Communication Quarterly. Vol. 76, No. 1, pp. 138–151.

McMillan, S. J. (2002). A four-part model of cyber-interactivity: Some

cyber-places are more interactive than others.   New Media & Society.
Vol. 6, No. 2, pp. 271 - 291.

Mount, DJ & Back K. J. (1999). A factor-analytic study of communication
satisfaction in the lodging industry.   Journal of Hospitality & Tourism
Research. Vol.23, no. 4, pp. 401-418.

Othman, M, Ismail, SN & Md Raus, M.I. (2009). The development of the
web-based Attendance Register System (ARS) for higher academic
institution: from feasibility study to the design phase. International
Journal of Computer Science and Network Security. Vol. 9, no. 10, pp.
203- 208.

Poster, J. M. (2007). Looking and Acting in Computer Games: Cinematic
"Play" and New Media Interactivity. Quarterly Review of Film and
Video. Vol. 24, pp. 325–339.

Preece, J. (2001). Sociability and usability in online communities:
determining and measuring success. Behaviour and Information
Technology.   Vol. 20, No. 5, pp. 347 – 356.

Premkummar, G. & Bhattacherjee, A. (2008). Explaining information
technology usage: A test of competing models. The International Journal
of Management Science Omega. Vol. 36, pp. 64-75.

Rafaeli, S. (1988). Interactivity: From new media to communication. Sage
Annual Review of Communication Research: Advancing Communication
Science. Vol. 16, pp. 110-134.

Reinig, B. A., Briggs, R.O & Vreede, G.J. (2009). Satisfaction as a function
of perceived change in likelihood of goal attainment: a cross-cultural
study. International Journal of e-Collaboration. Vol. 61, No. 14, viewed
4 August 2009,
<http://find.galegroup.com/itx/infomark.do?&contentSet=IAC-Documents&ty
pe=retrieve&tabID=T002&prodId=AONE&docId=A191817819&source
=gale&srcprod=AONE&userGroupName=adelaide&version=1.0>.

Shannon, C. and Weaver, W. (1949). The Mathematical Theory of
Communication.
Illinois: University of Illinois Press.

Simha, A & Kishore, R. (2009). Enhancing e-collaboration effectiveness
through the use of wikis: a theoretical examination in the context of

requirements elicitation. International Journal of e-Collaboration. Vol. 58, No. 2, viewed 4 August 2009, <http://find.galegroup.com/itx/ infomark.do?&contentSet=IAC-Documents&type=retrieve&tabID=T002 &prodId=AONE&docId=A203129231&source=gale&srcprod=AONE&u serGroupName=adelaide&version=1.0>.

Sims, R. (2000). An interactive conundrum: Constructs of interactivity and learning theory. Australian Journal of Educational Technology. Vol. 16, No. 1, viewed 15 August, 2009, < http://www.ascilite.org.au/ajet/ajet16/ sims.html>.

Sparks, B.(1994). Communicative aspects of the service encounter. Hospitality Research Journal.   Vol. 17, no. 2, pp. 39-50.

Steuer, J. (1995). 'Defining virtual reality: Dimensions determining telepresence', in F. Biocca and M. R. Levy (eds). Communication in the age of virtual reality. Hillsdale, NJ: Lawrence Erlbaum Associates, pp. 33–56.

Stromer-Galley, J. (2004). Interactivity-as-Product and Interactivity-as-Process. The Information Society. Vol. 20, pp. 391–394.

Tung, F.C., Chang, S.C & Chou, C.M (2007). An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry.   International Journal of medical Information, viewed 1 August 2008, <http://www.inti.elsevierhealth.com/ journals/ijmi>.

Vreede, G.-J, Mgaya, R.J.S & Qureshi, S. (2003). Field experiences with collaboration technology: A comparative study in Tanzania and South Africa.   Information Technology for Development. Vol. 10, pp. 201–219.